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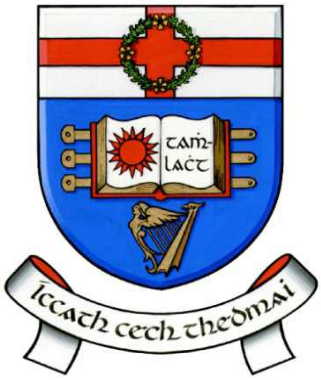

Tallaght Hospital (AMNCH)

LABORATORY MEDICINE USER MANUAL

Edition 8.5 2015

VALID UNTIL NEXT RELEASE
AUTHORISED BY DR ANN LEONARD
MINOR UPDATES WILL BE MADE TO THE .PDF VERSION LOCATED ON THE INTRANET/INTERNET.

Use of the guide

Every effort has been made to ensure accuracy of the content of this guide to our services. It is written for clinical staff that use the Laboratory at Tallaght Hospital (AMNCH). From time to time, it is necessary to update the content for operational reasons. This will lead to new version of the manual being published online. We normally do this on a twice–yearly basis.

The volume is published in .pdf format.

The present edition (8.5) is valid from January 2016.

CHANGES TO THE PREVIOUS EDITION ARE LISTED IN AMENDMENT SECTION (at end of manual) AND MUST BE CHECKED PRIOR TO USING THE MANUAL

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Consent for individual investigations may require prior agreement with the patient or guardian (see for instance the section on Genetic testing *pp* 19-27). Users of the Laboratory Medicine Service are advised to familiarise themselves with the Hospital publication –

‘Guidelines in relation to obtaining patient consent’
ORG-RM-GUI-001, which is available on QPulse.

Samples submitted for analysis may be used anonymously for quality control purposes following completion of testing.

All investigations and results produced by the laboratory are of a confidential nature in line with respecting the privacy of the patient / doctor relationship and the needs of the Clinical staff providing the care. Access to testing information and results should be on the basis of need only. Strict access and usage criteria are enforced with prevailing Data Protection Legislation. Users are referred to the Hospital Policy –

Patient Confidentiality ICT-ICT-POL-003

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LABORATORY MEDICINE QUICK DIRECTORY

Prefix (01) 414 for direct access from outside

LABORATORY MEDICINE AND CENTRAL SPECIMEN RECEPTION	
Main Office	3918 / 4703 / 4875
Central Specimen Reception	3917
Team Leader Porter	Access switch at 2000 for Bleep 6232
Phlebotomy	3040 / 3041

CLINICAL CHEMISTRY	
Registrar	3930 (Bleep 7285)
Results, Enquiries and Helpline	3952 or 3954
General Clinical Chemistry Lab	3951
Endocrinology Lab	3955
Sweat Test Appointments	3952
Glucose Tolerance Tests	3041 (Phlebotomy)
STAT Lab	3951
ON-CALL Medical Scientist On-Call Ring STAT Lab in First Instance Otherwise, On-Call	 Bleep 7283

HAEMATOLOGY AND BLOOD TRANSFUSION	
Registrars	3937 (Bleep # 6258/ 7025)
Haematology	
Results Enquiries	3932 / 3933 / 3959
Routine Haematology	3961
Coagulation	3963
Special Haematology	3960
Blood Transfusion Results Enquiries	 3964 / 3965
On-Call Medical Scientist On-Call	Bleep 7281

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MICROBIOLOGY

Results, Enquiries	3934 / 3935
Registrar	3936
General Microbiology Lab	3941 / 3942
Blood Cultures	3939
TB Lab	3944
Main Lab	3941 / 3942
ON-CALL Senior Medical Scientist On-Call	 Bleep 7280

CELLULAR PATHOLOGY
(HISTOPATHOLOGY AND CYTOPATHOLOGY)

Registrars	3922
Routine Laboratory	3973
Specimen Reception	3925
Frozen Sections	3973
Fine Needle Aspiration	3929
Enquiries	3929/3928 / 3985

POSTAL ADDRESS

Department of Laboratory Medicine,
Tallaght Hospital (AMNCH)
Dublin 24
Ireland

Tel: + 353-1-4143918

Fax: + 353-1-4143980

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LABORATORY MEDICINE DIRECTORY OF SENIOR STAFF

Clinical Director of Diagnostic Services	Dr Michael Jeffers	3921
Chief Scientist / Laboratory Manager (Acting)	Dr. Ann Leonard	3905
Laboratory Administration Officer	Ms. Breda Roberts	3918
Phlebotomy Manager	Ms. Meg Lawlor	3040 / 3041
Laboratory IT Officer	Mr. Tony Moulton	3967
Point of Care Test (POCT) Manager	Ms.Jane Fogarty	3609
Quality Manager	Dr. Ann Leonard	3968
Clinical Chemistry		
Consultant Chemical Pathologist	Dr. Gerard Boran	3911
Chief Medical Scientist	Mr. Michael Kelly	3908
Registrar		3930
Haematology		
Consultant Haematologist(Adult)	Prof. Helen Enright	3912
Consultant Haematologist(Adult)	Dr. Johnny McHugh	3913
Consultant Haematologist(Adult)	Dr. Ronan Desmond	4132
Chief Medical Scientist	Ms. Dympna Murphy	3909
Senior Registrar Adult Haematology		3937 Bleep 7025
Registrar Adult Haematology		3937 Bleep 6258
Blood Transfusion		
Consultant Haematologist Adult	Prof. Helen Enright	3912
Consultant Haematologist Adult	Dr. Johnny Mc Hugh	3913
Consultant Haematologist Adult	Dr. Ronan Desmond	4132
Chief Medical Scientist	Mr. Gerry Judge	3910
Registrars		3937 #7025 #6258
Cellular Pathology (Histopathology and Cytopathology)		
Consultant Histopathologist	Dr. Barbara Loftus	3914
Consultant Histopathologist	Dr. Michael Jeffers	3921
Consultant Histopathologist	Dr. Paul Crotty	3915
Consultant Histopathologist	Dr. Stephen Crowther	3991
Consultant Histopathologist Paediatric	Dr. Maureen O'Sullivan	3929
Consultant Neuropathologist	Dr. Francesca Brett	3929
Consultant Histopathologist On-Call		Contact Switch
Chief Medical Scientist	Dr. John O'Loughlin	3992
Microbiology		
Consultant Microbiologist	Prof.Philip Murphy	3919
Consultant Microbiologist	Dr. Susanna Frost	3920
Consultant Microbiologist	Dr. Deirdre Brady	3920
Chief Medical Scientist	Mr.Eddie Mc Cullagh	3906
Microbiology Registrar		3936 Bleep 7372
Infection Prevention & Control CNM	Ms. Dympna Mc Donnell	3938

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LABORATORY MEDICINE

1.0 LABORATORY MEDICINE

1.1 INTRODUCTION

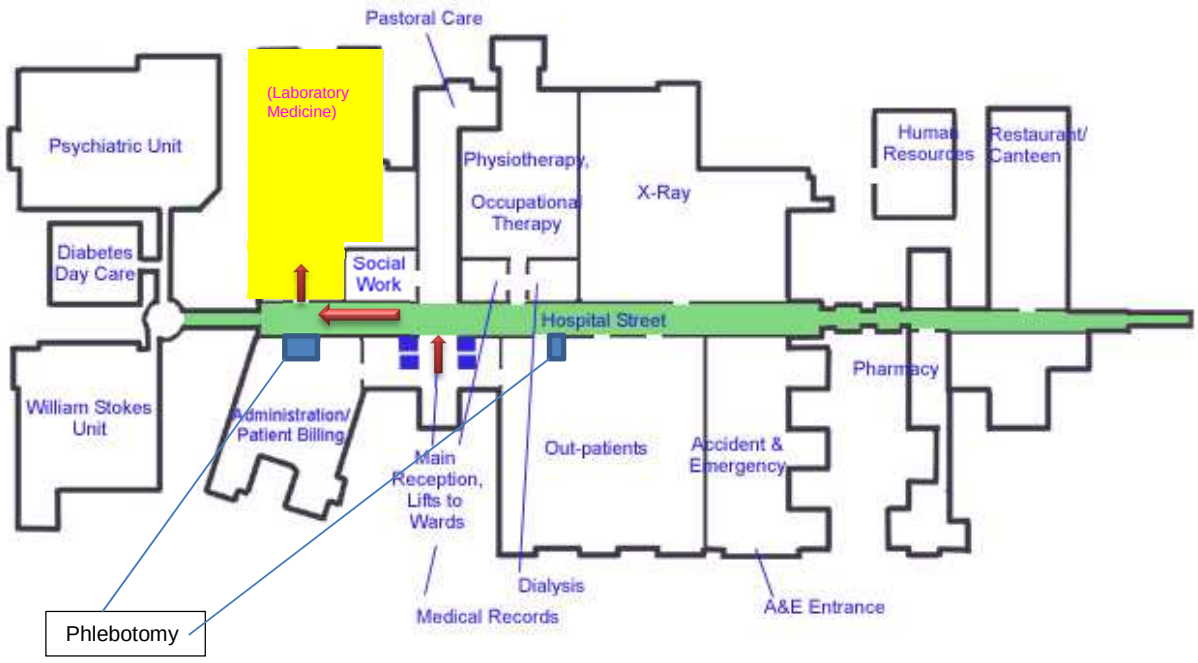
This user manual is intended as a guide to services provided by the Department of Laboratory Medicine, Tallaght Hospital (AMNCH) and is available on the hospital internet at www.amnch.ie. It is also available on the Hospital intranet page.

Each Laboratory Discipline maintains a section in the manual which describes –

- Services offered
- Test turnaround time (TAT)
- Specimen types,
- Reference ranges,
- Test specific information including patient preparation.
- Transport conditions for samples
- Contact requirements in advance of particular test requests
- Referral tests
- Information on out of hours emergency services and services provided outside the core working day.

The department is located on the ground floor of the main hospital building to the left of the main atrium. Access is via security card controlled double doors from the main Hospital Street. Phlebotomy is located at two sites as indicated on the diagram. Secure access to the Department facility is provided to hospital staff within the guideline of ISO15189 (5.2.2(a))

LOCATION OF THE LABORATORY



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The Laboratory Medicine Department is the Pathology Diagnostic Department for all clinical activity in the hospital and provides services to the community of General Practitioners supported by the hospital, and to other Health Care Institutions. There are 5 constituent departments - Blood Transfusion, Cellular Pathology, Clinical Chemistry, Haematology and Microbiology. The Laboratory Medicine Department also provides core adult phlebotomy services, together with external test referral for Immunology & Constitutional Genetics testing.

Important general information included in the guide -

1. Contact information is provided for key members of staff
2. Opening times
3. Instructions for completion of requests via the Order Communications System (KEY)
4. Minimum sample labelling requirements
5. Access to clinical advice and interpretation
6. The manner in which a complaint or comment may be made.

1.2 QUALITY MANAGEMENT SYSTEM

The Department of Laboratory Medicine is committed to providing a high quality, efficient and comprehensive service to our patients and clinical users. Central to this commitment is the Quality Management System (QMS). The Laboratory is accredited to ISO 15189 (2012) from the Irish National Accreditation Board (INAB) and is compliant with the requirements of EU Blood directive 2002/98/EC. The laboratory maintains a strong focus on continuous quality improvement for all aspects of its service.

The quality of results is of fundamental importance and the laboratory operates to strict scientific and management standards. Results are authorised within a framework of comprehensive internal and external quality control and quality assurance.

The Laboratory Medicine Department Quality Policy is displayed in the department and available at www.amnch.ie/laboratory/.

1.3 USER SATISFACTION, COMMENTS AND COMPLAINTS

There are a number of channels by which comments and complaints may be identified to the Laboratory Medicine Department. In all cases, it is department policy to respond in an open, positive and professional manner to issues raised, in line with the value statement of the hospital corporate and open disclosure. If necessary, adjustment to process may ensue.

Please refer to **APPENDIX 1** for information on comment and complaint reporting mechanisms.

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1.4 IMPORTANT ISSUES WHEN USING THE LABORATORY MEDICINE SERVICE

THE MECHANISM FOR REQUESTING TESTS IS THE OCS ELECTRONIC REQUESTING SYSTEM (KEY). THIS SHOULD BE USED IN ALL CASES UNLESS A TEST OR PROCEDURE IS NOT LISTED. SAMPLES ARE LABELLED WITH THE BARCODE LABEL PRODUCED BY THE SYSTEM.

IF A PAPER REQUEST FORM IS USED, PLEASE COMPLETE ALL SECTIONS OF REQUEST FORMS IN A FULLY LEGIBLE MANNER. IN PARTICULAR, IT IS IMPORTANT TO INCLUDE

- **PATIENT ID INFORMATION**
- **THE AMNCH PATIENT REGISTRATION NUMBER (MRN)**
- **INVESTIGATIONS REQUESTED**
- **DATE AND TIME OF SAMPLE COLLECTION**
- **RELEVANT CLINICAL INFORMATION**
- **RESPONSIBLE CLINICIAN'S NAME**
- **THE LOCATION OF THE PATIENT**

IT IS ESSENTIAL THAT ALL SAMPLES ARE LABELLED WITH A MINIMUM OF TWO IDENTIFIERS; PATIENT FULL NAME, AND MRN OR DATE OF BIRTH*. THE PERSON TAKING THE SAMPLE SHOULD INITIAL THE LABEL ON THE TUBE.

SAMPLES FOR BLOOD TRANSFUSION MUST HAVE 3 IDENTIFIERS; PATIENT FULL NAME, MRN, DATE OF BIRTH, AND MUST BE SIGNED BY THE PERSON TAKING THE BLOOD.

ALWAYS USE BLOOD COLLECTION TUBES THAT ARE IN DATE. BLOOD TAKEN INTO EXPIRED COLLECTION TUBES MAY RENDER THE SAMPLE UNSUITABLE OR IMPACT THE RELIABILITY OF THE RESULT.

WHEN TAKING A BLOOD SAMPLE, BE SURE TO WAIT UNTIL THE TUBE HAS FILLED TO THE LINE. Reference to "Order of Draw" if more than one sample is being taken should be included here.

WHEN REQUESTING OUT OF HOURS AND USING THE BLEEP FACILITY, NOTE PLEASE LEAVE MESSAGE & ADEQUATE TIME FOR PERSONNEL TO RESPOND.

***the activation of the AMNCH Major Emergency Plan may supersede this requirement .*

1.5 SPECIMEN RECEPTION

The specimen reception area in the Laboratory provides the following functions:

1. Supply of containers, request forms, urine dipsticks, FOB kits and pregnancy test kits. This service is available Mon – Fri 9.30 a.m. to 11.30 a.m.
2. Reception, collation and registration of specimens from GP patients.
3. Dispatch of referral samples *via* courier to other institutions within Ireland.
4. Dispatch of referral samples to international destinations.

1.6 REPORT DELIVERY

The following reporting arrangements stand:

1. The primary reporting mechanism for all reports from the laboratory is to the electronic **OCS database(KEY)**. Access is widely available throughout the hospital.
2. GP's may access their patient's results through the use of Healthlinks (www.healthlink.ie), and KeyWeb which provides an alternate access.

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3. Reports for inpatients (Blood Transfusion, Cellular Pathology & referral laboratories) will be sent to ward / clinical areas.

4. Reports for outpatients (Blood Transfusion, Cellular Pathology & referral laboratories) are sent to the clinical team.

5. Reports to A&E, (adult and paediatric) will be delivered to the A & E Departments. *Note this service is presently under review.*

1.7 SAFETY

The hospital safety statement is available on the hospital intranet site at
http://intranet.amnch.ie/Departments/Health&Safety/Safety_statement.htm

The laboratory safety statement is available on request.

THE LABORATORY USES STANDARD PRECAUTIONS WHEN HANDLING ALL PATIENT SAMPLES.

1.7.1 General Safety Guidelines

1. Always use approved sample collection containers and ensure lids are securely closed
2. Observe Standard Precautions when taking patient samples. Please ensure that you are familiar with the Infection Control and Prevention Guidelines pertinent to specimen collection which are available on QPULSE (see hospital intranet website)
3. Always dispose of sharps appropriately and according to the hospital waste disposal policy.
4. Samples must be placed in approved biohazard bag with request form (if available) placed separately in the sleeve provided. **DO NOT PLACE SAMPLE AND FORM TOGETHER IN SAME POUCH OF BIOHAZARD BAG**
5. Always supply clinical information including known infection risk with each request.
6. Any spills must be dealt with in accordance with hospital spill procedure. Please ensure that you are familiar with the Infection Control and Prevention Guidelines pertinent to spill management which are available on QPULSE (see hospital intranet website)

1.7.2 Radiation Safety

The procedure for managing 'hot' samples from patients who have received a radioactive imaging material or radiopharmaceutical material is available in Ionising Radiation Local Rules ADM-POL-5, located on the hospital QPULSE system.

1.8 SPECIMEN TRANSPORT

During the process of transporting patient samples to the laboratory it is essential that samples are transported safely and efficiently in order to:

1. Ensure safe custody and integrity of the sample which must reach the laboratory in proper condition and as quickly as possible
2. Ensure the safety of staff transporting samples
3. Ensure the safety of other staff, patients and members of the public

Please Note:
THE PNEUMATIC TRANSPORT SYSTEM (PTS) – (*IF APPROPRIATE TO THE SAMPLE TYPE)* - IS THE PREFERRED METHOD OF DELIVERY OF SAMPLES TO THE LABORATORY.Some useful hints for getting your specimens safely to the laboratory:

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1. Use approved in-date sample collection containers
2. Use approved sample collection biohazard bags which can contain any spills or leaks within the bag when properly sealed
3. Use the PTS sample transport system where available and if appropriate to sample type
4. Use sample transport boxes (closed) where appropriate
5. Do not try to carry multiple specimens by hand
6. Do not leave samples in other locations *en route* to the laboratory
7. If there is doubt about the safe packaging / presentation of samples for transport, ask a supervisor for advice
8. Do not transport broken or leaking samples from their source – report to supervisor
9. Report any spills or breakages to supervisory staff
10. If required, follow appropriate spill procedures as provided by the hospital ICP guidelines on QPULSE
11. Ensure that samples transported to the Laboratory are in line with prevailing ADR regulations
12. Please ensure that samples are transported in the correct condition to the Laboratory. In general, samples at room temperature that are transported without delay are acceptable. However, there are important exceptions and users are referred to individual disciplines for guidance.

Please refer to specific instructions in individual department sections of this user manual for transport of samples which require special conditions or handling. If in any doubt please contact the relevant department by telephone.

Brief PTS Operating Instructions are located on laminated cards at each Ward PTS station and a summary is available in appendix 3.

NOTE: in general the vast majority of samples processed by the Laboratory are Category B. However, in particular instances (such as threatened outbreaks such as EBOLA and Influenza) samples may be category A and require packing and transport arrangements appropriate to the transport of category A specimens.

1.9 AMNCH MAJOR EMERGENCY PLAN

This plan is part of the major accident plan for the greater Dublin area. Readers are referred to the Major Emergency Plan for details on how the plan should function. This is available on the hospital intranet site: http://intranet.amnch.ie/

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1.10 IMMUNOLOGY REFERRALS

1.10.1 Introduction

Requests for immunology (other than immunochemistry) are referred to the Immunology Department in the Central Pathology Laboratory (CPL), St. James's Hospital. The department offers both a comprehensive testing service and clinical advice. If you require clinical immunology advice you may contact Immunology Consultant at the following number: 01-4162928. If you have technical questions related to the immunology testing service please contact Dr Gerard O'Connor in Laboratory Medicine at 3905.

1.10.2 Specimen Requirements

In general for immunology requesting 2 clotted samples (red cap) must be provided. Requests should be made on the KEY OCS system or written out on the Immunology request form and accompanied by the appropriate number of correctly-labelled clotted samples. Ensure that sample date and time are recorded on tube. Please send to the Laboratory Medicine Department, AMNCH. Immunology Requests are processed each weekday morning and dispatched to the CPL by lunch time on that day.

SAMPLE REJECTION CRITERIA

Test requests may be rejected if the following situations apply:

- Sample types not compatible with tests requested.
- No serum sample provided.
- Significant difference between patient identifiers on sample and corresponding request form.
- MRN provided does not match the other details on the request form.
- Samples that do not have at least two acceptable identifiers.
- Sample volume inappropriate to test requested.
- Samples which are past the recommended time from phlebotomy to analysis
- Specimens taken into expired sample collection tubes
- Where sample quality would affect analysis e.g. haemolysis

1.10.3 Standard Tests

TEST	ABBREVIATION	NOTES
Anti-nuclear Antibodies	**ANA**	Levels of anti-nuclear antibodies may increase with age, infection, malignancy, therapy with certain drugs and a range of inflammatory disorders. As an approximate guide, higher levels of antinuclear antibodies are more likely to be associated with connective tissue disease. Typical TAT ~ 3-10days depending on degree of reflex testing required.
Rheumatoid Factor	**RHF**	Levels of Rheumatoid factor may increase with age, infection, malignancy, therapy with certain drugs and a range of inflammatory disorders. As an approximate guide, higher levels of rheumatoid factor are more likely to be associated with connective tissue disease. Typical TAT ~ 5 days.
DNA Antibodies	**DNA**	A DNA ELISA assay is performed if ANA is positive with a titre of 1:160 or greater. Typical TAT ~10 days depending on degree of reflex testing required.

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TEST	ABBREVIATION	NOTES
Extractable Nuclear Antigen	**ENA**	Extractable Nuclear Antigen Antibody is the screening test for all extractable nuclear antibodies. In general, repeat testing is unhelpful. If the ENA ELISA test is positive, the Immunology Laboratory will attempt to identify the antibody specificity [JO-1, LA, RNP, RO, SCL-70, SM]. Typical TAT ~ 3-16 days depending on degree of reflex testing required
Tissue Transglutamase	**tTG**	Anti tissue TransGlutamase antibodies are strongly associated with coeliac disease. Anti EMA test will follow all positive tTG tests. Anti EMA antibodies are highly specific for coeliac disease. An IgG EMA assay will be performed on samples known to be IgA deficient. Samples which show no no detectable anti tTG Abs will have serum protein electrophoresis and Ig quantitation performed. Typical TAT ~ 3 - 10 days depending on degree of reflex testing required.
Glomerular Basement Membrane Antibody	**GBM**	Anti Glomerular Membrane Antibody is available on an urgent basis by arrangement with the Immunology laboratory CPL. For urgent tests, the turnaround time is approximately two hours from time of specimen receipt. Typical TAT ~ 7 days for routine requests.
Anti-neutrophil Cytoplasmic Antibody	**ANCA**	Anti Neutrophil Cytoplasmic Antibody is available on an urgent basis by arrangement with the laboratory. For urgent tests, the turnaround time is approximately two hours from time of specimen receipt. ANCA titre will follow all positive ANCA results together with anti-PR3 and anti-MPO. Typical TAT~ 3-10 days depending on degree of reflex testing required.
Anti-Mitochondrial Antibodies	**MIT**	This is an immunofluorescence test. If positive, anti -PDH antibodies will follow. In general, repeat testing is not helpful. Typical TAT ~ 3-7 days depending on degree of reflex testing required.
Anti-Smooth Muscle Antibodies	**SMA**	Elevated levels of smooth muscle antibodies may be found in a variety of infectious disorders and in autoimmune hepatitis. Higher levels more often are associated with autoimmune hepatitis. A titre will follow for positive tests. Typical TAT ~ 3-7 days.
Anti-Parietal Cells Antibodies	**PCA**	Anti parietal cell antibodies are found in approximately 90% of patients with atrophic gastritis and pernicious anaemia. They may also be found in patients with other autoimmune endocrine disorders and in healthy relatives of patients. Typical TAT ~ 3 – 7 days.
Anit-Liver/Kidney/Microsomal Fraction	**LKM**	Anti-Liver Kidney Microsomal antibodies are associated with autoimmune hepatitis. LKM titre follows positive tests. Typical TAT ~ 3 - 7 days.
CSF for Oligoclonal Banding	**CFSO**	Should be sent through the normal requesting mechanism for CSF examination. **It is imperative in all cases that a serum sample is taken in order to correctly calculate the IgG index in the CSF and facilitate proper comparison of the Electrophoresis Protein Pattern.**

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Common referral immunology tests

Test	Abbreviation	Referral Laboratory	Notes
Acetyl Choline Abs	ACHR	Oxford Radcliffe Hospitals : CH: Pathology laboratory : IMMUNOLOGY	Anti acetyl choline receptor antibodies are strongly associated with myasthenia gravis but the test may be negative in approximately 10-15% of patients with this disorder. Typical TAT = 28 days.
Anti Ganglioside Abs - GM1	AGM1	Oxford Radcliffe Hospitals : CH: Pathology laboratory : IMMUNOLOGY	Anti ganglioside antibodies are associated with Guillane-Barre syndrome. Typical TAT = 28 days.
Anti Ganglioside Abs- GQ1b	AGQ1	Oxford Radcliffe Hospitals : CH: Pathology laboratory : IMMUNOLOGY	Anti ganglioside antibodies are associated with Guillane-Barre syndrome. Typical TAT = 28 days.
Anti GAD Abs	AGAD	Oxford Radcliffe Hospitals : CH: Pathology laboratory : IMMUNOLOGY	Anti GAD (glutamic acid decarboxylase) antibodies are found in approximately 80% of newly diagnosed type 1 diabetes and in stiff man syndrome.Typical TAT ~ 28 days.
Anti Hu / RI / Yo Abs	Neuronal Abs	Oxford Radcliffe Hospitals : CH: Pathology laboratory : IMMUNOLOGY	Anti HU,RI & YO are associated with paraneoplastic syndromes affecting the nervous system. Typical TAT = 28 days.
Anti Insulin Abs	IA	The Doctors Laboratory, Sonic Healthcare, London	Anti insulin antibodies are found in approximately 30% of patients with type 1 diabetes. Typical TAT = 28 days.
Anti Islet Cell Abs	ICA	UCLH (University College London Hospital), London, England	Islet cell antibodies are found in approximately 70% of patients presenting with type 1 diabetes.Typical TAT = 28 days.
Anti Adrenal Abs	ADR	UCLH (University College London Hospital), London, England	Anti adrenal antibodies are found in patients with addisons disease and in patients with auto immune polyglandular syndrome. Typical TAT = 28 days.
Anti Ovarian Abs	OVA	UCLH (University College London Hospital), London, England	Anti ovarian antibodies are found in patients with hypogonadism, addisons disease and in patients with auto immune polyglandular syndrome.Typical TAT = 28 days.
Anti MusK Ab.	MUSK	Oxford Radcliffe Hospitals : CH: Pathology laboratory : IMMUNOLOGY	These antibodies are found in approximately 40% of patients with negative anti-acetyl choline receptor myasthenia gravis. Typical TAT = 28 days.
Voltage Gated Ca Channel Ab.	VGCC	Oxford Radcliffe Hospitals : CH: Pathology laboratory : IMMUNOLOGY	These antibodies are associated with Lambert-Eaton myasthenic syndrome. Typical TAT = 28 days.

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Anti Voltage Gated K channel Ab.	VGKC	Oxford Radcliffe Hospitals : CH: Pathology laboratory : IMMUNOLOGY	Typical TAT = 28 days.
Myelin associated glycoprotein	AMAG	Oxford Radcliffe Hospitals : CH: Pathology laboratory : IMMUNOLOGY	Typical TAT = 28 days.

Allergen Testing

There are two phases to testing – firstly, an IgE level is determined in Clinical Chemistry protein chemistry unit; secondly specific allergens are measured at Immunology SJH. In the case of rarer allergens, these are sent to Sheffield NHS for analysis.

The criteria suggested by Immunology SJH with regard to allergen testing is as follows –

For the diagnosis of specific allergy in children and adults a good clinical history is recommended with testing for a limited number of suspected allergens. Requests for allergy testing should reflect these recommendations. For allergy education & step by step guidelines to clinical allergy diagnosis with .pdf versions of clinical history forms go to http://www.allergyeducation.co.uk.

Criteria for Ordering Specific Allergy Tests

As a guide to allergy testing in **rhinitis** and **childhood eczema due to food allergy,** the following screens may be considered.

- Perennial Rhinitis Screen: Specific IgE to **House Dust Mite(HDM)**,**Cat** and **Dog Dander**
- Seasonal Rhinitis Screen: Specific IgE to **Mixed Grass Pollen** and **Mixed Tree Pollen**
- Childhood Eczema Food Allergy Screen: Specific IgE to **Mixed Food** (Milk, wheat, cod, soya bean, egg white), **Mixed fish** (Cod, mussel, shrimp, salmon and tuna) and peanut. **THIS SCREEN WILL ONLY BE AVAILABLE FOR CHILDREN <13 YEARS.** Samples from adults should be tested for a maximum of 3 specific food allergens.

Available resources

St. James's Hospital, Department of Immunology Allergy Advice Service is intended to support medical staff in the diagnosis of allergy. For allergy advice, please email AllergyAdvice@stjames.ie.

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1.10.4 Immunology Result Reporting

Immunology result reporting takes place in 2 stages.

- A copy of the printed laboratory report is provided on all completed requests. These reports are returned to Laboratory Medicine Department where they are reviewed and then sent to the clinical teams / medical records for charting.

- Reports are transferred daily by electronic means from the Laboratory at SJH via MediBridge. Following review & authorisation, they transfer to the Order Communications System(KEY) and are available as part of the electronic patient record for laboratory results.

If you have any queries regarding the Immunology service, please contact Dr Gerard O'Connor at 3905 in Laboratory Medicine or another senior member of the Laboratory Staff.

1.10.5 Protocol for Requesting Urgent ANCA and Anti-GBM Requests, and Monitoring Patient Post Plasmapheresis.

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The Immunology Department, St James's Hospital provides a diagnostic laboratory service for the investigation of patients with disorders affecting their immune system. This service is currently available Monday-Friday 09.00-17.00 Hrs. In patients with suspected organ threatening ANCA-associated vasculitis or anti-GBM mediated disease, early diagnosis is crucial in support of prompt and appropriate treatment. The Immunology Department contributes to the prompt diagnosis of these disorders by providing an urgent out of hours service for ANCA and Anti-GBM testing.

The turnaround time from receipt of samples will be approximately two hours.

Procedure: Monday –Friday 09.00-15.00

The consultant or senior registrar must phone 01-4162924 and ask for the medical scientist responsible for urgent ANCA and GBM requests.

All other times

The **consultant in charge** must contact the following individual to organise the service.

Dr. Jean Dunne, **087 - 9963263**
Chief Medical Scientist / Senior Lecturer

N.B.

- At the time of request, a name and a mobile phone contact number must be provided for the communication of results.
- As the test is being conducted on an urgent basis the results should be regarded as preliminary and confirmatory results will be available on the next working day.
- A courier service must be organised for specimen transportation by the sender
- This service is being provided on a voluntary (non-payment) basis by the scientific staff and it is important that it is used appropriately.

MONITORING RESPONSE TO PLASMAPHERESIS IN PATIENTS WITH ANTI-GBM DISEASE

When a patient has been prescribed a course of plasmapheresis as part of treatment for anti-GBM disease, serial measurements of Anti-GBM titre are often used to guide therapy. As the majority of IgG is extravascular a period of 24 Hrs should elapse to allow equilibration before the final post plasmapheresis sample is taken. In addition, for optimal comparative purposes samples taken during a course of plasmapheresis should be assayed together.

In such circumstances, these samples will **not be considered 'urgent'** and will be batched and processed at the same time at the end of planned course. The serial results will be made available the day after completion of the last planned session, to allow clinicians to use them as guidance should further sessions be required.

Therefore, once a decision has been made to start a patient on a course of plasmapheresis, please liaise with the lab by ringing 01-4162924 to advise regarding the number of sessions planned and the completion date.

Samples should also be labelled in relation to the plasmapheresis session e.g. "post 4th plasmapheresis sample"

1.11 GENETIC TESTING

1.11.1 Introduction

The laboratory offers a comprehensive programme of referral genetic testing to clinical departments. This is provided as a number of distinct process 'streams'.

- Each Department in the Laboratory provides specific genetic testing pertinent to their scope and profiles. Users should refer to the appropriate User Manual sections for relevant instructions.

- Test for Hereditary Haemochromatosis should be directed to the Haematology laboratory where they are referred to an independent facility for analysis. *Note that this service is expensive*.

- For constitutional cytogenetic testing and molecular genetic testing the Laboratory refers these as follows –

    - Constitutional karyotype (Chromosome + FISH) testing is referred to the National Centre for Medical Genetics – NCMG (www.genetics.ie) if the request meets the following criteria –

        - New-borns and children (<5 yrs old) for chromosome analysis
        - Microdeletion syndromes for FISH-only analysis (no age restriction)
        - On-going family studies

    - Constitutional karyotype (Chromosome + FISH) testing for all other patients is referred to an independent laboratory (currently www.Biomnis.ie) for analysis.

    - Molecular testing is referred in the first instance to the **National Centre for Medical Genetics** at Our Lady's Hospital for Sick Children, Crumlin, Dublin 12. This is the designated national centre for medical genetics. **Hereditary Haemochromatosis testing is not available at NCMG.** The NCMG will carry out onward referral for tests outside their scope to reputable laboratories abroad.

    - Tests for Array CGH/ Chromosome analysis are referred to ViaPath at Guy's and St Thomas' NHS Foundation, London,

      In all cases, correct request forms for the designated referral laboratory together with a signed consent form are required. Request and consent forms are available on the referral laboratory websites and illustrated below. Cut-off time for receipt of requests is 12.00 noon on Thursday of each week.

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Direct referral to international centres of excellence may be required by our clinical teams when a patient presents with a known or suspected rare molecular defect. The Laboratory facilitates this service following discussion and the arrangement is for samples to be sent directly to these centres using their designated request forms (see individual laboratory websites), with reports returned to the clinical teams.

On the National Centre for Medical Genetics website (www.genetics.ie). users are able to access the genetic requesting form including consent details together with guidelines and policies on sample identification and general rules for testing. It is best practice in all cases to obtain written consent from patients when genetic testing is being performed.

In summary the following should be noted:

- There are only 3 acceptable identifiers to the National Centre for Medical Genetics (NCMG).
    - The full name
    - Date of Birth (DOB)
    - Hospital / Medical Record Number

2. All samples must be clearly labelled with a name according to the criteria for specific sample type with at least one of the other two identifiers. Compound names must be present on both sample and referral form (see **policy on identification details required on samples submitted for genetic analysis** at www.genetics.ie). Note that the referral laboratory will reject any requests where there is a mismatch between patient demographics on the request form and sample(s).

3. The request form must be received with the sample.

SAMPLE REJECTION CRITERIA

Test requests may be rejected if the following situations apply:

- Sample types not compatible with tests requested
- Significant difference between patient identifiers on sample and corresponding request form
- MRN provided does not match the other details on the request form
- Samples that do not have at least two acceptable identifiers
- Sample volume is inappropriate for test request
- Samples which are past the recommended time from *phlebotomy to analysis*
- Samples taken over weekends or public holidays.
- Specimen taken into expired sample collection tubes
- Where sample quality would effect analysis e.g. haemolysis

Any samples not meeting minimal acceptable criteria will not be tested until appropriate steps have been taken by the requester in line with NCMG / Biomnis policy.

1.11.2 Turn-Around Times

It may take > 12 months for results of genetic testing to be returned. In general however, routine cytogenetic tests are reported within 8-10 weeks and most molecular genetic testing is available within 4 months.

1.11.3 The Process for Reporting constitutional & molecular genetic is as follows

- The original signed report is issued from the referral laboratory to the requesting clinician. A copy of the report is often sent to the Laboratory Medicine Department at AMNCH for review & storage.

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- The reports from the referral laboratory contain a key laboratory number assigned by them together with relevant clinical details, sample identification, family details and date of receipt of the sample. In addition the critical PID details on the patient are listed together with mutations identified, additional mutations sought and the final genotype. In all cases the referral laboratory issues a commented report and you will find that they may include specific useful references associated with the particular mutation reported on and the tests methodology / probes used in the analysis.

- Reporting of genetics and molecular genetic testing is viewed as confidential. The Laboratory Medicine Department maintains a scanned copy of those reports that have been returned to them.

- As noted above, the National Centre for Medical Genetics may forward samples for genetic testing to a specialised centre in the UK, Europe or North America. In these cases reports will be returned in the first instance to the NCMG and subsequently forwarded to the requesting clinician with a copy going to Laboratory Medicine. These latter requests are expensive and the Hospital at AMNCH is specifically charged for these referral tests.

If you have technical questions relating to the constitutional genetic service please contact Dr Gerard O'Connor at 3905 or a senior member of the Laboratory team.

The Laboratory continues to develop the Genetic Reporting Service to our clinicians & are presently reviewing ways in which OCS may be utilised as part of the service.

Important General Notice Regarding Referral Testing

We regard referral testing as vital to our clinical colleagues and supportive of their clinical need to deliver the best possible care to their patients. In particular, we regard it as essential that access is provided to unusual and rare analytes & molecular genetic analyses that will never be directly provided within the state. We must however balance this against escalating costs which in 2014 are expected to reach €600,000 with substantial additional transport costs.

As a consequence and with the support of Senior Management -

It is policy that rare and uncommon tests and analyses which are referred to laboratories overseas must be approved at Consultant level by the requesting team. Senior Laboratory Management may seek to discuss individual requests as part of any cost-curtailment exercise.

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1.12 POINT OF CARE TESTING (POCT)

POCT testing is testing performed by non laboratory staff near to the patient rather that in the clinical laboratory. The rapidity of obtaining a result can contribute to improved outcomes for patients. It is essential that all POCT is conducted within a framework of quality standards in compliance with national guidelines.

Point of Care Testing Manager: Ms. Jane Fogarty

3609

Jane.fogarty@amnch.ie

Access to Service (TRAINING)

Training and competency assessment is required for access to POCT equipment under the governance of the POCT committee
To schedule training please contact: **Jane.fogarty@amnch.ie**

Blood Gas Analysis

Analysers are located in ED, ITU, Theatre, PHDU and AMU. There is a backup service available in the Clinical Chemistry Laboratory - see Clinical Chemistry section on ABG's – (PROTOCOL FOR BLOOD GAS SPECIMENS) for details.

Glucometry

There are 120 glucose meters located throughout the hospital for use in patient monitoring.

HbA1C analysis

POCT instruments are located in adult and paediatric diabetes OPD for monitoring diabetic control

Application for New Services

Any new POCT services must be approved by the POCT committee. Application form is available from the POCT Manager

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2.0 GENERAL PRACTITIONER (GP) SERVICES

Laboratory Medicine Specimen Reception is available to receive correctly labelled samples and completed request forms directly from patients. Patients can collect specific sample containers e.g. 24hour urine collection containers, from specimen reception staff, who will also supply instructions (verbal and written) in the use of such containers.

SPECIMEN RECEPTION
PATIENT SAMPLE DROP IN
HOURS OF OPENING:

Monday – Friday 9.00 am to 5.00 pm
&
Saturday - 9.00 am to 11.30 am

GPs may arrange supplies by contacting the general office at 4143918 or faxing in a requisition form (available on request) to 4143980.

We greatly value our service to General Practitioners and continuously seek to improve on it. Should you have any queries relating to the service, please contact Dr Gerard O Connor at 4143905 or a senior member of the Laboratory Team.

1.1 PARTICULAR REQUIREMENTS FOR USE OF COURIER SERVICE FOR SAMPLE COLLECTION FROM GP PRACTICES

A daily sample collection and report delivery service is in operation for a number of GPs who use the services of the Laboratory Medicine department at AMNCH.

Please note the following requirements:

2.1.1 PATIENT IDENTIFICATION DETAILS

- Each **request form** (use AMNCH GP request form only) should include the following minimal information –

- o Patient surname
- o Patient first name
- o Patient full address *(please note if address has changed)*
- o Date of Birth (DD/MM/YYYY)
- o Sex
- o Date and time of sampling
- o Tests requested
- o Clinical and relevant treatment details
- o GP name
- o GP practice + telephone / fax number
- o Alternative contact number for urgent results if outside practice hours

If you have an AMNCH MRN for your patient, please include in the top left-hand box on the form.

Please use only ballpoint pen when completing the request form. With the commencement of Healthlinks, it is vital that correct patient demographics and GP name / practice are filled in on the request form.

- **Specimen containers** should be labelled correctly. Minimum demographic details to be included on the bottle –

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- Patient surname
- Patient first name
- Date of Birth (DD/MM/YYYY)
- Please also include date and time of sampling (DD/MM)

All samples for Blood Transfusion (e.g. Group and Antibody screen) should be handwritten with:

- Full Name
- Date of Birth
- Date and time of sampling
- Signature of person taking the blood

Note: Use a 6ml EDTA tube for these Blood Transfusion tests.

2.1.2 PACKING REQUIREMENTS FOR TRANSPORT OF SAMPLES

The laboratory does not process leaking, unlabelled or mislabelled specimens.

- Samples must be placed in a biohazard bag with request form placed separately in the sleeve provided. **DO NOT PLACE SAMPLE AND FORM TOGETHER IN THE SAME POUCH IN BIOHAZARD BAG**

➢ Samples are placed in the approved transport box carried by the courier.

➢ In the case where patients are requested to drop in samples to the laboratory, it is important that the same level of care is taken with the identification and packaging of specimens.

SAMPLE REJECTION CRITERIA

Test requests may be rejected if the following situations apply:

- Sample types not compatible with tests requested.
- Significant difference between patient identifiers on sample and corresponding request form.
- MRN provided does not match the other details on the request form.
- Samples that do not have at least two acceptable identifiers.
- Sample volume inappropriate where applicable
- Samples which are past the recommended time from phlebotomy to analysis
- Expired sample collection tubes
- Where sample quality would effect analysis e.g. haemolysis

Note:
Please ensure samples reach the laboratory in as short a time as possible post phlebotomy as delays may impact on the ability to perform certain analyses; please refer to the individual department sections for information specific to tests you may wish to request.

2.2 GP REPORTS AND ENQUIRIES

Healthlinks is the primary reporting mechanism for GP laboratory reports. There are two trigger times in operation at present and authorised reports will be dispatched routinely at 12.00 noon and 4.00 pm.

Printed reports are posted to GP surgeries or delivered by courier to those availing of that service.

A number of GP's avail of Key OCS (KeyWeb) system for patient results.

Telephone enquiries can be made to individual laboratories at the numbers listed at the beginning of this manual. In all cases, very urgent results or those of grave clinical significance will be communicated to the practice where possible. GP's should endeavour to provide a mechanism whereby contact may

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be made out of hours as required. Note: If you have an urgent request, please contact the laboratory section in advance and tick the urgent box on the request form.

The laboratory does not generally issue reports to GP's arising from requests generated by Hospital Consultants. If a copy of such a report is required, contact the appropriate clinical team.

2.3 GP LIAISON GROUP

There is an active GP Liaison Group at AMNCH.

2.4 INFORMATION FOR GP'S ON AMNCH INTERNET SITE

There is an information section (including this user manual) for GPs on the hospital internet site at www.amnch.ie

2.5 SAMPLE TYPE / SAMPLE VOLUME AND REQUIREMENTS FOR PARTICULAR TESTS

Please refer to individual department sections for complete instructions on sample types and collection containers and any other specific instructions.

ALWAYS USE BLOOD COLLECTION TUBES THAT ARE IN DATE. BLOOD TAKEN INTO EXPIRED COLLECTION TUBES MAY RENDER THE SAMPLE UNSUITABLE OR IMPACT THE RELIABILITY OF THE RESULT.

If in any doubt please contact the relevant department by telephone.

We endeavour to provide an efficient and effective service to our GP community and their patients. If you have queries or questions relating to the laboratory service please contact Dr Gerard O'Connor at 3905 or a senior member of the Laboratory team.

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ORDER COMMUNICATIONS SYSTEM (KEY)

3.0 ORDER COMMUNICATIONS SYSTEM (KEY)

It is the policy of the department that OCS is the primary means by which tests (other than blood transfusion and cellular pathology) are requested. We maintain a manual requesting process for backward compatibility only and it is being presently phased out.

The Order Communications System between Clinical areas and the Laboratory is in place for both routine and urgent requesting.

Electronic result reporting from Disciplines in the Laboratory to all clinical areas is operational. Thus, any report that is generated electronically on the Laboratory computer system will be available after authorisation on the OCS system, provided it is not a restricted test or that the sample originates in another hospital.

Significant advantages accruing from electronic ordering include:

- Replacement of the need to write request forms for those tests and disciplines that are using electronic ordering (Clinical Chemistry, Haematology and Microbiology).
- Availability of a pre-printed specimen barcode label that removes the need to write on specimen tubes.
- Status indicators for outstanding requests – these are available on-line.
- The system contributes substantially to improved patient safety by reducing sample and request identification errors.

For full details of the operational policy for the OCS system, please refer to the ICT policies on QPULSE (hospital users only).

REMEMBER:

Patient identity **MUST** always be confirmed before a sample is taken

Samples must be labelled at all times

Log off when leaving the computer

For training, fault logging, etc please contact the ICT Helpdesk (extn. 2041/2042)

DO NOT GIVE OUT YOUR PASSWORD TO ANYONE!!

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ADULT PHLEBOTOMY SERVICE

4.0 ADULT PHLEBOTOMY SERVICE

The Phlebotomy Manager may be contacted at 3040/41.

4.1 PROCEDURE FOR ORDERING FOR IN-PATIENTS

Monday to Friday Phlebotomy Ward Rounds are given in table 4.8 below.

Saturday and Sunday service is for "urgent requests" only.

All requests for tests are raised on the OCS system and manual ordering using request forms is only used where there is no OCS provision, this should be the exception.

Cut-off time for ordering of blood tests is 6.00 a.m. Staff placing orders after this time must be aware they will not be collected until the following day.

In special circumstances, **after consultation with and the agreement of** the attending phlebotomist additional requests may be placed.

- Completed and **dated** request forms must contain the following information:

  Patient Surname and First name
  D.O.B.
  Gender
  MRN
  Clinical details
  Location
  Tests required
  Requesting Clinician

If urgent, please state clearly on request form and it will be given priority. This status should be used for requests where an urgent result will add to immediate patient care as urgent requests are handled outside the normal test stream and require resources to achieve. For routine tests turn-around times are given in each department section in this manual and are frequently reviewed to improve efficiency.

- Patient Identification is confirmed by checking wristband for the following:

  Full Patient name
  D.O.B
  MRN

This information is checked against the details on the OCS label and when verified the label is applied to the sample tube when samples have been taken.
For manual orders the details are written on the sample tube when samples have been taken

All request forms must be left at the agreed location on each ward.

As samples are obtained they are sent to the Laboratory throughout the morning until rounds are completed.

If blood sample cannot be obtained due to (e.g.):

Patient unavailable**,**

Phlebotomist unable to obtain sample**,**

The phlebotomist will contact the relevant ward and inform them that the sample could not be obtained.

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The relevant team will decide whether to leave requests until the following day or to take them themselves.

If requests are to be placed on the following day's phlebotomy work list, please change the date on request form and leave at the agreed location. If it is decided not to proceed with the blood tests, the team must discard the request forms or cancel the OCS request.

When ordering fasting or other tests that require patient preparation, please ensure that the patient and nursing staff are informed.

4.2 PROCEDURE FOR MANUAL ORDERING FOR OUT-PATIENTS

- Completed and dated request forms must contain the following information:

  Patient Surname and First name
  D.O.B.
  Gender
  MRN
  Clinical details
  Location
  Tests required
  Requesting Clinician

If urgent please state clearly on request form and it will be given priority.

- Patient Identification is confirmed, allowing sampling to proceed, by asking the patient to state their full name and date of birth without prompting

  Full Patient name
  D.O.B

This information is written on the sample tube when samples have been taken or alternatively, a label generated in phlebotomy containing patient details is applied to the tube.

- If ordering fasting blood glucose levels please clearly state **fasting on request form, and inform the patient**, taking cognisance of the insulin dependent diabetic.
- When requesting a Glucose/ Lactose Tolerance Test it is necessary to make an appointment: **Contact ext. 3041 for appointment.**

Refer to 4.8 below for adult phlebotomy hours of service

4.3 REQUEST FOR GROUP & CROSSMATCH/SAVE SAMPLE

- **(See Blood Transfusion Section)**
- It is mandatory that in-patient is wearing an identity bracelet which can be checked for his/her:

  Surname
  First Name
  D.O.B
  MRN

4.4 PROCEDURE FOR TEST ORDERING FOR ST. LOMANS

There is an interim policy for Phlebotomy pending introduction of positive patient identification mechanism in Psychiatric Unit.

The Nurse-in-Charge shall allocate staff member to identify each patient requiring blood tests.
The allocated staff member shall positively identify each patient requiring blood tests, sign the OCS request sheets or requisition forms, remain with the Phlebotomist and assist with venepuncture procedure if required.

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4.5 REQUEST FOR PATIENT ON CLOZARIL MEDICATION

The request is signed by the Nurse in charge and the Phlebotomist on the OCS request list. Clozaril packs are made up by Night Staff and left in the Nurses' Station for the Phlebotomist.

4.6 GP PHLEBOTOMY SERVICE FOR ADULTS

Patients referred by their GP can have blood samples taken by the phlebotomy service at AMNCH.

Patients can avail of this service by booking an appointment at -

http://www.amnch.ie/Departments-Clinics/Departments-A-Z/Phlebotomy-Blood-Tests-Adults/

There is a patient information leaflet available to instruct patients on preparation for their blood tests. Information is also regularly sent to GP practices regarding the provision of the phlebotomy service for their patients.

Requirements for completion of request forms and sample labelling as given in 4.2 above apply to GP patients.

OPENING HOURS FOR GP PHLEBOTOMY

Monday – Friday 10.00 am – 1.30pm

LOCATION

The GP Blood Test Area is adjacent to the OPD Reception Area

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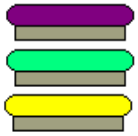
4.7 BLOOD COLLECTION ORDER OF DRAW

CAT NO.	SPEC. VOL.	ORDER OF DRAW	COLOUR CLOSURE	TUBE CONTENT	EXAMPLE ASSAYS	MIXING INSTRUCTIONS	SPECIAL INSTRUCTIONS
Blood Culture	10ml (Adult) 4ml (Paed)	Draw MUST be first, preferably separate venesection			Whichever system is used to draw blood, please ensure Blood Cultures are taken first to avoid contamination. See Infection Control Blood Culture Policy	Rotate gently to mix	Deliver by hand to Microbiology immediately
		Order of draw minimizes carry over of anticoagulant					
454349	3ml	1		Tri-sodium Citrate Solution	FILL TO LINE ON BOTTLE. All coag tests - for increased accuracy 2 coag samples can be taken and first discarded (tissue factor contamination during venepuncture) Renal transplant workup 20ml (take a clotted sample as well)	After blood collection invert tube 4 times	Fill to arrow line, under or over filled tubes CANNOT be used
		2	**Black**		ESR- FILL BLOOD TO LINE ON BOTTLE	After blood collection invert tube 4 times	
454071	4ml	3		Clotting Accelerator	Serology, Immunology & Virology Tests, Cold Agglutinins, Viral Antibody & Antigen Testing, Antibiotic Assays, Anti Cardiolipin AB, B12Folate, Ferritin, RA, Intrinsic Factor AB SPEP, FLC, LDH, Li, Cyroglogulins,	After blood collection invert tube 5 – 10 times	Allow 30 mins before centrifuging
454083	4ml	4		Heparin	General Biochemistry, Lipid Profile, TDM, Hormone Studies, Endocrinology Tests	After blood collection invert tube 5 – 10 times	Lipid Profile may require a FASTING sample
454041	3ml	5		EDTA	FBC, HBA1C, Haemoglobinopathy investigation Malaria Parasites, Sickle Cell, Reticulocyte Count, Coombs Test, Ciclosporins, Tacrolimus, Immunophenotyping, Silrolimus, PTH, HbA1c, Ammonia, HCY, Renin, ACTH, DNA Analysis.	After blood collection invert tube 8 – 10 times	
456093	6ml	6		EDTA	Group & Screen, Group & Crossmatch, Direct Coombs Test, Bone Marrow Workup	After blood collection invert tube 8 – 10 times	Handwritten Details only, must be signed NO Addressograph NO exceptions
454091	4ml	7		Sodium Fluoride Potassium Oxalate	Blood Sugar Glucose Levels Glucose Tolerance Tests Lactate	After blood collection invert tube 5 – 10 times	State time on sample and state whether sample is FASTING or RANDOM
	SOME PROFILES REQUIRE A COMBINATION OF SAMPLES. CONTACT THE RELEVANT LABORATORY FOR INFORMATION						
FURTHER INFORMATION CONTACT: Blood Transfusion: 3965/ Haematology: 3961/ Biochemistry:3994/3995/ Histology: 3971/ Microbiology 3940							

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4.8 ADULT PHLEBOTOMY DEPARTMENT STARTING TIMES / HOURS OF SERVICE

WARD	A&E	CCU	ICU	ALL MALE SURG.	ALL FEMALE SURG.	ALL MALE MED.	ALL FEMALE MED.	CLINICAL DECISION UNIT	AGE RELATED HEALTH	PSYCH.	ALL O.P.D. REFER.	ALL G.P. REFER.	SACU
Mon	7.30am-11.30am	7.30am-9.30am	7.30am-8.30am	7.30 am-12.00pm	7.30 am-12.00pm	7.30am-12.00pm	7.30 am-12.00pm	7.30 am-8.30am	7.30 am-8.30am	7.30am-8.30am	8.00am-4.45pm	10.00am-1.30pm	7.30am-12.00am
Tues	7.30am-11.30am	7.30am-9.30am	7.30am-8.30am	7.30am-12.00pm	7.30am-12.00pm	7.30am-12.00pm	7.30am-12.00pm	7.30am-8.30am	7.30am-8.30am	7.30am-8.30am	8.00am - 4.45pm	10.00am-1.30pm	7.30am-12.00am
Wed	7.30am-11.30am	7.30am-9.30am	7.30am-8.30am	7.30 am-12.00pm	7.30 am-12.00pm	7.30 am-12.00pm	7.30 am-12.00pm	7.30 am-8.30am	7.30 am-8.30am	7.30am-8.30am	8.00am-4.45pm	10.00am-1.30pm	7.30am-12.00am
Thurs	7.30am-11.30am	7.30am-9.30am	7.30am-8.30am	7.30am-12.00pm	7.30am-12.00pm	7.30am-12.00pm	7.30am-12.00pm	7.30am-8.30a,	7.30am-8.30am	7.30am-8.30am	8.00am-4.45pm	10.00am-1.30pm	7.30am-12.00am
Fri	7.30am-11.30am	7.30am-9.30am	7.30am-8.30am	7.30am-12.00pm	7.30am-12.00pm	7.30am-12.00pm	7.30am-12.00pm	7.30am-8.30am	7.30am-8.30am	7.30am-8.30am	8.00am-4.45pm	10.00am-1.30pm	7.30am-12.00am
Sat	N/A	6.50am-8.00am	6.50am-7.30am	6.50am - 12.00pm	6.50am - 12.00pm	6.50am - 12.00pm	6.50am - 12.00pm	6.50am - 8.30am	6.50am – 8.30am	N/A	N/A	N/A	7.00am-10.00am
Sun & Bank Hols.	N/A	7.00am-10.00am	N/A	7.00am-11.00am Gogarty Crampton Maguire Osborne Burkitt SACU CCU	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	7.00am-10.00am

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CLINICAL CHEMISTRY

5.0 CLINICAL CHEMISTRY

5.1 INTRODUCTION

Advice concerning interpretation of the investigations available and comments or suggestions relating to the service or this manual should be addressed to the Consultant Chemical Pathologist, Dr Gerard Boran, or other senior staff.

5.2 CLINICAL CHEMISTRY PERSONNEL

Please dial appropriate members of staff directly for clinical enquiries and enquiries regarding service provision and operational issues.

DR. GERARD BORAN	Consultant Chemical Pathologist	3911
CLINICAL CHEMISTRY SpR	Registrar	3930 or Bleep 7285
MR. MICHAEL KELLY	Chief Medical Scientist	3908
MS. BERNADETTE GANNON	Administrative Assistant (Grade V)	3952 or 3954

Insert (01) 414 before extension number for direct access from outside

5.3 REQUESTING INVESTIGATIONS

REQUEST FORMS AND SAMPLE LABELLING

Order Communications System (OCS) must be used for requesting unless the test is not available on the system. The use of forms increases the risk of patient/sample identification errors and missed tests. Turnaround time for request forms will be significantly greater than for requests made through OCS. All requests must be requested as outlined above. Verbal requests for tests are NOT accepted under any circumstances.

These will be required until the Order Communications System (OCS) is fully operational. Please use iPMS stickers for Patient I.D. and complete all sections legibly - you must provide the Tallaght Hospital Number (MRN) if available.

There is a requirement for a minimum of two acceptable identifiers on both sample and request form.

Acceptable identifiers are:

- Primary identifier – Full Patient name
- Secondary identifiers:
  - MRN (when available)
  - Date of Birth

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Other information which should be included with the request:

- Date and time of sample collection
- Destination for report
- Requesting clinician name and contact details
- Patient address (if MRN not available)
- Patient gender
- Priority status
- Sample type
- Tests requested

SAMPLE REJECTION CRITERIA

Samples may be rejected if the following situations apply:

- Sample types not compatible with tests requested.
- Significant difference between patient identifiers on sample and corresponding request form.
- MRN provided does not match the other details on the request form.
- Samples that do not have at least two acceptable identifiers.
- Samples which are past the recommended time from phlebotomy to analysis
- Samples that have been left un-separated overnight will not be analysed
- Expired sample collection tubes
- Where sample quality would effect analysis e.g. haemolysis
- Sample volume insufficient

PATTERNS OF REQUESTING

Tests may be requested specifically by name or by group. Specific requesting is preferred when possible. Renal, liver and bone 'profiles' will be available (for constituents see table "ASSAY FREQUENCY / TURNAROUND TIMES/SAMPLE TYPE" in section 5.9).

SPECIMEN COLLECTION AND PACKAGING

Specimen collection should comply with requirements stated in the Specimen Guide. Specimens together with the Request Form should be placed inside a plastic biohazard bag and dispatched to the laboratory.

DISPATCH TO THE LABORATORY

Specimens should be delivered to the laboratory as soon as possible after collection. All specimens should be delivered on the day of collection.

Blood samples taken for measurement of Potassium should ideally be received in the laboratory within 4 hrs. Delays in sample transport can result in falsely elevated values.

Blood samples for potassium measurement should NOT be refrigerated.

Use of the phlebotomy service in Tallaght Hospital will ensure prompt delivery to the laboratory.

Specimens should normally be dispatched to the laboratory using the Pneumatic Tube System (PTS). See separate instructions.

HEALTH AND SAFETY

Standard precautions should be observed when handling all pathological material. Specific instructions for sending radioactive samples are available in the local rules for ionizing radiation.

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5.4 NORMAL HOURS AND DEADLINES FOR ROUTINE ANALYSIS

Monday to Friday	08:00 – 20:00	**Deadline:** Specimens for general chemistry and routine endocrinology, requested using the OCS system, from inpatients, in Lab by: 16:00 will be reported by 20:00
Saturday AM	09:00 – 12:30	**Deadline:** Specimens for general chemistry, from inpatients (OCS requests), in Lab by: 11:00 will be reported by :12:30

Routine samples arriving after the stated deadlines will be analysed on the next routine working day.

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5.5 SPECIAL PROCEDURES

Protocols are available from the laboratory.

Appointments/Results/Enquiries	
Glucose Tolerance Tests	3041(Appointments) 3952/3954 (Results)
Sweat Tests*	3952 or 3954 Appointments & Results enquiries *** Requests for urgent appointments must be discussed with the Clinical Chemistry Registrar**
Diagnostic Endocrinology Clinic	For endocrinology dynamic function tests. Requests for appointments must be discussed with Clinical Chemistry Registrar at Ext. 3930 or Bleep 7285

5.6 RESULTS AND ENQUIRIES

Results will normally be reported via the Order Communications System and will be available for viewing on wards shortly after being authorised for release by the laboratory staff. Printed reports will also be issued twice daily and are delivered by the Portering staff.

Clinical Chemistry General Enquiries Helpline: 3952 or 3954

- All results enquiries should be made to 3952 or 3954;
- Advice on selection of tests, interpretation of results and sampling procedures will be directed to the appropriate person.

RETROSPECTIVE REQUESTING (ADD-ON REQUESTS)

Clinical Chemistry specimens are retained for a period post-analysis.
If you need further tests on a specimen that is already in the laboratory, send a **Request form for Additional Tests** (CC-LF-001A) to the laboratory. All sections must be completed, including "Reason for the addition of these tests". Use this form only for Clinical Chemistry tests.
Analyses for additional tests are subject to stability of analyte. In general tests can be added up to 24 hours post collection, after 24 hours it is preferable to collect another sample.
Some tests are not suitable for add-on requesting, these are:

Alcohol (ETOH) (May be possible up to 6hrs Subject to sample suitability)
Ammonia
Bicarbonate (May be possible up to 6hrs Subject to sample suitability)
C Peptide
Electrophoresis
Glucose
HCG
Insulin
Ionised Calcium
Lactate
Tumour Markers
UIBC

TELEPHONING OF RESULTS

All reasonable efforts will be made to communicate critical results. These will be telephoned to the requesting source or the requesting team.
Special arrangements will be agreed with certain users to reduce unnecessary phoning of results.

Table of Critical Values for Specific Serum Analytes for phoning.

Analyte	Results to be Phoned
Sodium	<125 mmol/l >150 mmol/L
Potassium (In patient)	<2.50 mmol/l >6.00 mmol/L
Potassium (GP/OPD)	<2.9 mmol/L >6.0 mmol/L
Potassium (Haemolysed Sample)	<3.5 mmol/L
Calcium (Corrected)	<1.90 mmol/l > 2.90 mmol/L
Phosphate	<0.40 mmol/l >3.00 mmol/L
Magnesium	<0.50 mmol/l >1.80 mmol/L
Bicarbonate	<15.0 mmol/l >35.0 mmol/L
Plasma Glucose	<2.8 mmol/l >20.0 mmol/L
Urea/Creatinine	Urea > 12.0 mmol/L with normal creatinine Urea > 12.0 mmol/l with Creatinine >200 umol/L(If first occurrence)
Ethanol	>250 mg/dl
Paracetamol	All reportable levels mg/L
Salicylate	All detectable mg/L
Urine Toxicology screen	Phone all positive results
Non ICU Total Protein	<50 g/L and > 100g/L (If first occurrence)
Non ICU Albumin	<25g/L
Iron	>60 umol/L
CSF Glucose /Protein	All , except neurology OPD
CK	>5000 IU/L(500 if first time)
HCGS/	All Positive
T.Bili	> 250 umol/L (first time)
ALT/AST	>500 IU/L (if first time)
Amylase	> 200 IU/l
Ammonia	All (umol/L)
ABG's	All
Lactate	>5.0 mmol/L
Osmolality (Serum)	<240 and> 310 mOsm/Kg
Troponin	All > 100 mg/L
Urate	>750 umol/L

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Table 2.

Table of Serum Analytes to be phoned for patients with established CRF.

Analyte	Results for Phoning
Sodium	<120 mmol/L >160 mmol/L
Potassium	<2.50 mmol/L >7.0 mmol/L
Calcium (Corrected)	<1.80 mmol/L > 3.20 mmol/L
Phosphate	>5.00 mmol/L
Magnesium	<0.50 mmol/L >2.00 mmol/L
Urea	>50.0 mmol/L

Table 3.

Table of Serum Therapeutic drug critical levels for phoning

Drug	Results for Phoning
Carbamazepine	>25.0 mg/L
Digoxin	< 0.3 and > 2.6 ug/L
Phenobarb	> 45.0 mg/L
Phenytoin	> 30.0 mg/L
Theophylline	> 30.0 mg/L
Valproate	No need to phone (unless stated overdose)
Cyclosporin (Renal)	> 300 ng/ml
Lithium	<0.30 mmol/L >1.00 mmol/L

Table 4.

TABLE OF ENDOCRINOLOGY CRITICAL LEVELS FOR PHONING

Hormone	Results for Phoning
Cortisol	<90 nmol/L

FT4/TSH	Grossly Abnormal results eg. TSH >=75 IU/L FT4>=75 pmol/L
HCGS/HCGU	All positive pregnancy tests

5.7 STAT LAB EMERGENCY SERVICES

The emergency service is available on a 24-hour, 365 day basis. The range of tests outside routine hours is restricted – see below. In certain circumstances, other tests may be requested but these would require discussion with the person on-call or with the laboratory medical staff on-duty.

NOTIFICATION OF EMERGENCY WORK

Within routine hours please telephone the Stat Lab. This is essential to ensure that the specimen is expected and is handled as an emergency test. Please note that marking a sample "Urgent", or requesting an urgent test on OCS will not cause it to be handled urgently unless the Stat Lab has been telephoned. Critical results will be telephoned to the location on the original request.

All requests from the A&E, ICU, Theatre, Children's HDU and Paeds A&E will be automatically treated as emergency tests without the requirement of phoning the Stat Lab. Outside routine working hours (8pm to 8am) the On Call scientist must be paged to let them know samples are being sent to the laboratory.

ALL URGENT WORK MUST BE NOTIFIED BY PHONE	
Within Normal Working Hours	**Outside Normal Working Hours**
Phone: 3952	In the first instance: **Phone the Stat Lab: 3951** Otherwise: **Contact the Scientist on-call on HOSPITAL BLEEP 7283 and leave a message. Contact Switch if there is no reply**

COMMON INVESTIGATIONS (UNRESTRICTED)

- Acid-Base, Blood Gases, Carboxyhaemoglobin, Meth Hb
- Renal, Liver, Bone profiles.
- CRP
- Glucose
- Lactate
- Amylase
- Pregnancy tests
- Conjugated bilirubin, where appropriate
- Calcium, ionised calcium, albumin, phosphate, magnesium, urate.
- Ammonia (inform lab in advance)
- Iron-(suspected overdose)-in children
- Cardiac Markers (Troponin T)
- Salicylate, paracetamol, ethanol
- CSF Glucose and Protein
- Spot Urine Na/K
- Serum or urine osmolality
- Urine Toxicology Screening

ON-CALL INVESTIGATIONS REQUIRING CONSULTATION

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- Therapeutic Drugs (digoxin, theophylline, lithium, anticonvulsants, methotrexate, ciclosporin etc..)
- Urine Chemistries not mentioned above
- Other Chemistries not mentioned above

  Planned investigations occurring out of hours or over weekends should be discussed in advance with the Clinical Chemistry medical team.

ON-CALL INVESTIGATIONS AVAILABLE

The Emergency Service cannot accommodate routine investigations. These will be analysed on the next working day. Common unrestricted investigations are shown above Investigations in the "Requiring Consultation" category must be discussed in the first instance with the on-call Medical, Surgical, or Paediatric Registrar who should then contact the Chemical Pathology Registrar or the Consultant Chemical Pathologist. Further details can be obtained from the on-call scientist.

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EMERGENCY TOXICOLOGY

Most requirements for emergency toxicology can now be met locally, e.g. salicylate, paracetamol, ethanol and urine toxicology screen. Certain other poisons (e.g. iron overdose in children) are available as emergency tests on-site. Please note that toxicology testing for medico-legal purposes is not currently available, including ethanol for "drink-driving" cases.

Additional Toxicology investigations can be included in the local emergency repertoire as the need arises. Any such requirements should be discussed with the Consultant Chemical Pathologist.

Toxicology requests which cannot be met locally should be discussed with the Toxicology Lab in Beaumont Hospital.

Tel No: **01-8092673 / 01-8092675**

Mobile: **(087)2590749**

Fax: **01-8092435**

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5.8 SERVICE AGREEMENTS FOR VARIOUS INVESTIGATIONS

We will endeavor to meet the following standards, subject to availability of sufficient staff and other resources including the Order Communications System (OCS).

ALL USERS	STANDARD SET
Routine Clinical Chemistry (OCS requests)	90% released to OCS within 4 hours of receipt, subject to cut-off
Routine Endocrinology (OCS requests)	90% released to OCS on the next working day.
Blood Gases	Release to OCS within 15 minutes of receipt

SPECIAL ARRANGEMENTS	STANDARD SET
ICU	Agreed daily "ICU Profile" received before 07:45 will be released to OCS by 09:00
Dialysis	Potassium - Release to OCS within 20 minutes of receipt

5.9 ASSAY FREQUENCY / TURNAROUND TIMES/SAMPLE TYPE

Analyte	Available Urgently without consultation (Normal Hours 8am-8pm)	Sample Type	Assay Frequency	TurnAround Time	Comment
Turnaround times (TAT) of Clinical Chemistry tests are regularly monitored **Urgently processed requests**:- >90% within one hour of receipt **Routine** general chemistry:->90% within 4 hours of receipt (subject to cut-off) **Routine** endocrinology:->90% within 24 hours of receipt (subject to cut-off) **Daily cut-off time for same day reporting** of routine samples is: 16:00hrs					
AFP		LH	#Daily on arrival	72 hrs	Requests subject to screening
Albumin	√	LH	*Daily on arrival	4hrs	
ALP	√	LH	*Daily on arrival	4hrs	
Alpha 1 anti Trypsin		LH	*Daily on arrival	24hrs	
ALT	√	LH	*Daily on arrival	4hrs	
Aluminium		White	Monthly	4 weeks	
Ammonia (NH3)	√	EDTA	*Daily on arrival	4hrs	Contact laboratory in advance. Send on ice
Amylase	√	LH	*Daily on arrival	4hrs	
Arterial Blood Gas	√	Syringe	Daily on arrival	15 mins.	Send to laboratory within 15 mins(max)
AST	√	LH	*Daily on arrival	4hrs	
Bicarbonate	√	LH	*Daily on arrival	4hrs	
Bilirubin –Direct	√	LH	*Daily on arrival	4hrs	
Bilirubin –Total	√	LH	*Daily on arrival	4hrs	
BNP		LH	*Daily on arrival	72hrs	Requests subject to screening
Bone Profile **(Ca,Phos, Alk.Phos)**	√	LH	*Daily on arrival	4hrs	
C Peptide		LH	Weekly	1-7 days	One run per week - Monday
C3		LH	2 Batches per week	24hrs	
C4		LH	2 Batches per week	24hrs	
CA 153		LH	#Daily on arrival	72 hrs	Requests subject to screening
CA 199		LH	#Daily on arrival	72 hrs	Requests subject to screening
CA125		LH	#Daily on arrival	72 hrs	Requests subject to screening
Caeruloplasmin		LH	*Daily on arrival	24hrs	
Calcium	√	LH	*Daily on arrival	4hrs	
Calcium - Ionised	√	Syringe	Daily on arrival	15 mins.	Send to laboratory within 15 mins(max)
Carbamazepine	√	LH	*Daily on arrival	4hrs	
Carboxyhaemoglobin	√	LH	Daily on arrival	15 mins.	
CEA		LH	#Daily on arrival	72 hrs	Requests subject to screening
Chloride	√	LH	*Daily on arrival	4hrs	
Cholesterol	√	LH	*Daily on arrival	4hrs	
CK	√	LH	*Daily on arrival	4hrs	
Copper		TE	Monthly	4 weeks	
Cortisol		LH	#Daily on arrival	24hrs	
Creatinine	√	LH	*Daily on arrival	4hrs	
CRP	√	LH	*Daily on arrival	4hrs	

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Analyte	Available Urgently without consultation (Normal Hours 8am-8pm)	Sample Type	Assay Frequency	TurnAround Time	Comment
CRP-S	√	LH	*Daily on arrival	4hrs	
Cryoglobulin		SE	Daily on arrival	7 days	Contact Ext. 4856 - heating block required.
Cyclosporine		EDTA	Weekly	1-7 days	One run per week –Wed 2pm
Digoxin	√	LH	*Daily on arrival	4hrs	
Electrophoresis		SE	2 Batches per week	3-7 days	Dependent on additional processing
Ethanol	√	LH	Daily on arrival	4hrs	
FK 506 (Tacrolimus)		EDTA	2 Batches per week	1-6 days	Two runs per week Tues/Wed 2pm
Free Light Chains (kappa, lambda)		SE	2 Batches per week	1-7 days	One run per week - Wednesday
FSH		LH	#Daily on arrival	24hrs	
GGT	√	LH	*Daily on arrival	24hrs	
Glucose	√	FlOx	*Daily on arrival	4hrs	
Growth Hormone		LH	#Daily on arrival	1-7 days	One run per week – Monday
Haemoglobin A1c		EDTA	*Daily on arrival	1 day	
HCG (pregnancy)	√	LH	Daily on arrival	4hrs	
HCG (tumour marker)		LH		72 hrs	Requests subject to screening
HDL-C	√	LH	*Daily on arrival	4hrs	
Homocysteine		EDTA	*Daily on arrival	1-7 days	One run per week . Send immediately on ice.
IGA		SE	*Daily on arrival	4hrs	Immunoglobulin only requests
IGE		SE	2 Batches per week	4 days	
IGG		SE	*Daily on arrival	4hrs	Immunoglobulin only requests
IGF1		LH	One batch per week	1-7 days	One run per week - Monday
IGF BP3		LH	One batch per week	1-7 days	One run per week - Monday
IGM		SE	*Daily on arrival	4hrs	Immunoglobulin only requests
Insulin		LH	Weekly	1-7 days	One run per week - Monday
Iron	√	LH	*Daily on arrival	4hrs	
Lactate	√	FlOx	Daily on arrival	1 hour	Processed urgently
LDH	√	SE	*Daily on arrival	4hrs	
LH		LH	#Daily on arrival	24hrs	
Lipid Profile (Chol, Trig, HDL, LDL)	√	LH	*Daily on arrival	4hrs	
Lipoprotein a	√	LH	2 Batches per week	1-7 days	One batch per week - Wednesday
Lithium		SE	#Daily on arrival	4hrs	
Liver Profile (TP, Alb, T.Bil, ALT, Alk Phos. GGT)	√	LH	*Daily on arrival	4hrs	
Bioactive prolactin		LH		4 days	2 runs per week Tuesday and Friday
Magnesium	√	LH	*Daily on arrival	4hrs	
Methotrexate		LH	#Daily on arrival	4hrs	
Microalbumin		Urine	2 Batches per week	24hrs	
Occult Blood		Guaiac card	*Daily on arrival	2 days	

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Analyte	Available Urgently without consultation (Normal Hours 8am-8pm)	Sample Type	Assay Frequency	TurnAround Time	Comment
Oestradiol		LH	#Daily on arrival	24hrs	
Osmolality	√	LH	*Daily on arrival	4hrs	
Paracetamol	√	LH	*Daily on arrival	4hrs	
Parathyroid Hormone		EDTA	#Daily on arrival	24hrs	
pH (Fluid)		Syringe	*Daily on arrival	4hrs	
Phenobarbitone	√	LH	#Daily on arrival	4hrs	
Phenytoin	√	LH	#Daily on arrival	4hrs	
Phosphate	√	LH	*Daily on arrival	4hrs	
Potassium	√	LH	*Daily on arrival	4hrs	
Progesterone		LH	#Daily on arrival	24hrs	
Prolactin		LH	#Daily on arrival	24hrs	
Protein - Total	√	LH	*Daily on arrival	4hrs	
Protein - Urine		Urine		4hrs	
Prot/Creat Ratio		Urine	*Daily on arrival	4hrs	
PSA		LH	#Daily on arrival	24hrs	
Renal Profile (Na, K, Urea, Creat)	√	LH	*Daily on arrival	4hrs	
Salicylate	√	LH	Daily on arrival	4hrs	
Sodium	√	LH	*Daily on arrival	4hrs	
Sweat Test		N/A	Three times per week	Day of test	3 days per week –Mon., Tues, Thurs.
T3 (Free)		LH	#Daily on arrival	72 hrs	Requests subject to screening
T4 (Free)		LH	#Daily on arrival	24hrs	
Testosterone		LH	#Daily on arrival	24hrs	
Theophylline	√	LH	#Daily on arrival	4hrs	
Thyroid Function Test (TSH, FT4)		LH	#Daily on arrival	4hrs	
TPO		LH	#Daily on arrival	24hrs	
Triglyceride	√	LH	*Daily on arrival	4hrs	
Troponin	√	LH	*Daily on arrival	4hrs	
TSH		LH	#Daily on arrival	24hrs	
CSF Protein	√	CSF	*Daily on arrival	4hrs	
UIBC		LH	#Daily on arrival	4hrs	
Urate	√	LH	*Daily on arrival	4hrs	
Urea	√	LH	*Daily on arrival	4hrs	
Valproate		LH	#Daily on arrival	4hrs	
Zinc		TE	Monthly	4 weeks	
LH=Lithium Heparin, SE = Serum (Clotted), FlOx = Fluoride Oxalate, TE = Trace Element					
Urines -general chemistry					
Urgently processed requests:- 90% within one hour of receipt Non Urgent requests -within 2 working days of receipt Urinary electrophoresis requests – within 14 days of receipt					

For tests not listed above please contact a senior member of laboratory staff before sending the specimen.

Specimens for some specialised analysis are referred to external laboratories. A complete list of details of all referral laboratories is contained in the form CC-LF-701G, this is available on request. Referral

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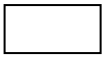
laboratories are evaluated and selected in terms of competence to perform the requested examinations and accreditation status.

5.10 SPECIMEN GUIDE

BLOOD SPECIMENS

The common specimen requirements are heparinised plasma, serum (from whole blood which has clotted), fluoride-oxalate plasma, and EDTA whole blood or plasma. For most biochemical and endocrine tests the preferred specimen tube is a 5mL heparinised tube. Requests raised using OCS will generate a label with the appropriate sample type indicated.

Specimen Guide – Blood Tubes		
Lithium Heparin Tube	Green Orange (Paed.)	Most Clinical Chemistry analyses, except those stated below Glucose (assuming analysis within 1 hour)
EDTA Tube	Purple	HbA1c, Renin, ACTH, , PTH, Lead, Homocysteine, Cyclosporin, FK506
Fluoride Oxalate Tube	Grey Yellow (Paed.)	Glucose (where a delay before analysis of >1 hour is likely), Lactate
Serum (Clotted) Tube	Red	Aldosterone, Electrophoresis, FLC, Lithium, LDH, Cyroglobulins,
Trace element Tube (Copper, Zinc)	Navy	Copper, Zinc
Aluminium	White 	Aluminium
Balanced Heparin (ABG) Syringe		ABG, Ionised Calcium Fluids for pH

SAMPLE VOLUMES

- It is preferable that blood tubes, especially those containing preservatives, are filled to their stated capacity. This avoids any risk of insufficiency or interferences from excess concentrations of preservative.
- This is mandatory for some tests, e.g. PTH, where the increased EDTA concentration that results from under filling would invalidate the test.
  EDTA tubes for PTH must be filled to the mark.
- It is usually possible to process smaller samples where the tube is at least half filled i.e. 2mls or, in the case of paediatric tubes, 0.7ml. A limited chemistry profile can usually be obtained on such samples.

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- We will always try to maximise the use of any sample. In the case of very short samples please indicate those tests that are of highest priority.

SPECIAL CASES

- Requests for RENIN should be accompanied by two 4ml EDTA tubes
- Contact the laboratory at Ext. 3952 with special queries.

SENT AWAY / REFERRED SPECIMENS/UNUSUAL REQUESTS

Please contact a senior member of laboratory staff to discuss any unusual requests before sending the specimen. Specimens for some specialised analysis are referred to external laboratories. Samples for certain analysis will be sent away when the capacity of the local system is exceeded.

Reports returned for referred tests are scanned and saved on the shared drive : (F:\Shared\UserGroups\Clinical_Chemistry_Referral_Reports). Instruction CC-LI-701G "User Guide - finding scanned External Referral reports (Clinical Chemistry)" describes how to find these and is available on request.

Files are arranged in Year titled folders and the date returned (YYMMDD). The date returned is recorded in the Key OCS report. The original reports are sent to the requesting team.

PROTOCOL FOR BLOOD GAS SPECIMENS

Please Note:
The Blood Gas Analysers in ICU, Theatre, Accident & Emergency and PHDH are for use by trained staff in those areas only. Samples for Blood Gas analysis from any other location should go directly to the laboratory. The protocol outlined below must be followed for samples going to the laboratory.

In order for the laboratory to process Blood Gas samples as quickly and safely as possible the following simple rules must be followed.

- The heparinised syringe must be labelled with a IPMS addressograph label or a hand written label. The patient's name, IPMS number and location must be clearly identified.
- The specimen must be accompanied by a Clinical Chemistry Request form completed with the patient's name etc. as per section 5.3 REQUESTING INVESTIGATIONS - REQUEST FORMS AND SAMPLE LABELLING. Please include a bleep number if available.
- **Any air** in the syringe **must** be expelled.
- **The needle must be removed from the syringe and destroyed as soon as the sample has been taken. The cap provided must be fitted to the syringe.**
- The sample may be sent to the laboratory via the PTS or brought by hand. If the PTS is used, the sample must be held securely within the canister so that it cannot move about. It is essential that the syringe contains NO air. Sending a sample in the PTS will exacerbate the effects of air in the sample.
- If you have any questions about the taking or analysing of Blood Gas samples, contact the laboratory at ext. 3951.

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URINE SPECIMENS

Analytes in urine are usually determined in one of the following: (1) a timed (e.g. 24 hour) collection, (2) a random/spot urine, (3) a random urine with results expressed as a ratio with creatinine.

URINE SPECIMEN GUIDE	ACID (24 hr urine with HCl added)	ACID WASHED (pre-washed in nitric acid and rinsed with water)	Plain 24 hr container	Spot Urine	Comment
Aldosterone	✓		✓		
Amino acids				✓	
5-amino laevulinate (ALA)			✓		Protect from light
Amylase				✓	
Arsenic		✓			
Bence Jones Protein BJP	**See**	**"Electrophoresis"**			
Cadmium		✓			
Calcium (refrigerate)	✓				
Catecholamines [Adults] (adrenaline, nor-adrenaline, dopamine)	✓				
Catecholamines [Paeds] (adrenaline, nor-adrenaline, dopamine)				✓	Send to laboratory immediately
Copper		✓			
Cortisol			✓		
Creatinine (refrigerate)	✓		✓		
Cystine			✓	✓	24hr preferred
Electrophoresis (BJP)			✓	✓	At least 20ml early morning urine
5-HIAA	✓				
HMMA, also VMA	✓				
Homovanillic acid	✓				
Phosphate (inorganic)	✓				
Iron		✓			
Lead		✓			
Magnesium			✓		
Mercury		✓			
Metanephrines	✓				
Organic acids (freeze)				✓	
Osmolality				✓	
Oxalate (refrigerate)	✓			✓	24hr preferred
Porphobilinogen (PBG)			✓	✓	Spot for emergency PBG screen Protect from light
Porphyrins			✓		Protect from light
Potassium (refrigerate)			✓	✓	
Protein/Creatinine Ratio				✓	
Protein (refrigerate)			✓		Protein/creatinine ratio (see above) is the recommended test
Sodium (refrigerate)			✓	✓	
Stone (Kidney/Renal) screen	✓		✓		Two 24 hr collections are required for a full Stone Screen (Plain + Acid**)**
Urate (Do not refrigerate)			✓		
Urea (refrigerate)			✓		
Zinc		✓			

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*5.11 * ESTIMATED GLOMERULAR FILTRATION RATE (EGFR)*

INTRODUCTION OF eGFR:

The Irish and the UK guidelines on classification and monitoring of chronic kidney disease (CKD) recommend assessing renal function based on an estimated glomerular filtration rate, the eGFR. CKD has been classified into 5 stages based on the patient's eGFR and other evidence of renal impairment such as proteinuria. The Clinical Chemistry Department, Adelaide and Meath Hospital, in association with the Consultant Nephrologists, is introducing a protocol whereby an eGFR will be calculated for all creatinine requests received on outpatients and GP patients. This eGFR is based on the formula derived in the "Modification of Diet in Renal Disease" (MDRD) Study. The MDRD formula is based on 4 variables: serum creatinine; age; gender and ethnicity. Serial measurement of eGFR is essential in assessing the severity of any renal condition. The eGFR will replace the 24 hour creatinine clearance for many patients (see below). eGFR underestimates normal or near normal glomerular function so results above 90 will be reported as >90 ml/min per 1.73m^2.

THE CHRONIC KIDNEY DISEASE CLASSIFICATION IS AS FOLLOWS:

Stage	Description	
1	"Normal" GFR	**e**GFR >90 ml/min/1.73 m^2 with other evidence of chronic kidney damage*
2	Mild impairment	**e**GFR 60-89 ml/min/1.73 m^2 with other evidence of chronic kidney damage*
3	Moderate impairment	**e**GFR 30-59 ml/min/1.73 m^2
4	Severe impairment	**e**GFR 15-29 ml/min/1.73 m^2
5	Established renal failure	**e**GFR <15 ml/min/1.73 m^2 or on dialysis

***The "other evidence of chronic kidney damage" may be one of the following:**

- Persistent microalbuminuria
- Persistent proteinuria
- Persistent haematuria (after exclusion of other causes, e.g. Urological disease)
- Structural abnormalities of the kidneys demonstrated on ultrasound scanning or other radiological tests e.g. polycystic kidney disease, reflux nephropathy and/or Biopsy proven chronic glomerular nephritis

NB: Without this other evidence, a GFR >60/ml/min **does not indicate CKD**.

FACTS ABOUT THE MDRD eGFR:

- eGFR will be reported in mL/min/1.73m^2. Since the MDRD formula underestimates GFR in patients with normal or near normal kidney function eGFRs of ≥90 mL/min/1.73m^2 will be reported as >90 mL/min/1.73m^2.
- eGFR is not valid in patients with rapidly changing renal function e.g. acute renal failure. Plasma creatinine should be monitored in these patients.
- The MDRD eGFR calculation was validated in Caucasian and Afro-Caribbean patients with renal disease in the USA. Patients of Afro-Caribbean origin have a higher muscle mass so the eGFR should be multiplied by 1.21 for black patients. Although it has not been validated for all ethnic or population groups, the eGFR has been accepted for use in white and South Asian populations.
- MDRD eGFR has NOT been validated for calculating drug doses.
- Creatinine clearance with timed urine collections is still required for measuring GFR in certain circumstances:
    - Extremes of body size and age e.g. severe malnutrition or obesity, elderly, children < 18 years
    - Pregnancy, Vegan diet, Creatine supplements
    - Skeletal muscle disease e.g. muscular dystrophy, paraplegia, quadriplegia, amputee
    - Prior to dosing with nephrotoxic / chemotherapy drugs
- Microalbuminuria is still the gold standard for detecting early renal disease in patients with diabetes mellitus.
- ***eGFR formula varies slightly depending on the method used to analyse creatinine.***

If you have any queries please contact the Chemical Pathology team in the Clinical Chemistry Laboratory.

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PROTEIN CREATININE RATIO

Protein Creatinine Ratio (PCR) is available for screening and monitoring of proteinuria. A random urine sample is the specimen required for this investigation. PCR is not affected by hydration status. This will be reported as mg Protein/mmol of Creatinine (mg/mmol). A 24 hr urine collection will no longer be required for assessing renal protein excretion. Interpretation of results should be based on the table below.

Table: Based on the UK CKD Guidelines

PCR mg/mmol	UK CKD	Approx dipstick Equivalent	Comment
<15	Normal	Negative	Normal
15-44	"Trace" protein	Trace	Trace proteinuria
45-100	Clinical proteinuria (Macroproteinuria)	1+	Two or more PCR results > 45, in the absence of UTI, indicates proteinuria
> 100	Clinical proteinuria (Macroproteinuria)	2+	Marked proteinuria. Suggest referral to Nephrologist
≥ 450	Nephrotic range proteinuria	3+	Nephrotic Syndrome Range Suggest urgent referral to Nephrologist

NB:- Urinary Microalbumin measurement is still the gold standard for detecting early renal impairment in diabetic patients

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CHRONIC KIDNEY DISEASE

Stage	eGFR mL/min/1.73m^2	Associated Metabolic Disturbance	Interpretation	Minimum Frequency of Monitoring Renal Function
1	>90	• Hypertension – more frequent than in patients without kidney disease	Normal GFR. Not CKD unless there is other evidence of chronic kidney damage e.g. • persistent microalbuminuria, proteinuria and/or haematuria (not urological); • radiological diagnosis • biopsy proven chronic glomerulanephritis	Yearly if patient has evidence of CKD
2	60 – 89	In CKD patients: • Hypertension • PTH starts to increase	Mild impairment if there is other evidence of CKD (see above) Mild decrease in GFR is common in 30% of healthy adults	Yearly if patient has evidence of CKD
3	30 – 59	• Hypertension is frequent • Calcium absorption and phosphate excretion decrease • PTH increases is more marked • Onset of Malnutrition • Onset of Anaemia (erythropoietin deficiency) • Onset of LVH	Moderate impairment Treat complications Monitor progression Referral to a Nephrologist if: • condition progressive (more than 20% deterioration in eGFR or plasma creatinine) • Microscopic haematuria present • Urinary microalbumin:creatinine ratio > 3.5 or protein:creatinine ratio ≥45 • Unexplained anaemia • Abnormal K^+, Ca^{2+}, or Phos • Uncontrolled BP (>150/90)	Yearly if stable 6 monthly if just diagnosed or progressive
4	15 – 29	• As for stage 3 but more pronounced • Triglyceride levels rise • Risk of Hyperkalaemia • Hyperphosphataemia • Metabolic acidosis • Decreased libido	Severe impairment Suggest referral to a Nephrologist	6 monthly if stable 3 monthly if just diagnosed or progressive
5	<15	• As for stage 4 but more pronounced • Salt retention causing heart failure • Anorexia • Vomiting • Pruritis – without skin disease	Established renal failure (ERF) Suggest urgent referral to a Nephrologist	3 monthly

*Classification of CKD proposed by the US Kidney Diseases Outcome Quality Initiative (K/DOQI) Group[8]

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5.12 TUMOUR MARKER SERVICE

Measurement of tumour markers can be useful for monitoring in-patients with an established diagnosis of certain tumours. Hence, a Tumour Marker Assay Service has been provided at AMNCH for use primarily by oncology teams who are managing patients with a cancer diagnosis or with pre-malignant conditions.

With the possible exception of PSA, it is not appropriate to screen patients either in primary or secondary care using tumour markers. This is due to the low sensitivity of the markers for the detection of malignancy and the unacceptably high false positive rates in the general population which may lead to unnecessary further investigation and concerns, and possibly false reassurance. In particular, the practice of "screening" patients admitted to hospital with a panel of markers is not appropriate.

REQUESTS SUITABLE FOR ANALYSIS

Adequate clinical details must be included with each request.

The following indications are generally recognized in the international literature:

Medical Oncology, Gastroenterology and Related Teams

- For the monitoring of established malignancy
- AFP for surveillance for hepatocellular carcinoma in high risk patients (i.e. cirrhosis, or other chronic liver diseases such as chronic active hepatitis). "Abnormal LFT's" is NOT sufficient evidence.
- For the investigation of Cancers of Unknown Primary
  (ESMO/NCCN suggested panel: HCG, AFP, PSA, CA 125, CA 15-3)
- CEA is offered for colorectal cancer (CRC) monitoring.

Gynaecology

- CA-125 Rapid Access Service for ovarian tumours as agreed with the Gynaecologists.

Surgical Oncology

- C19.9 for the investigation of pancreatic tumours and chronic pancreatitis.

Breast Markers

- C15.3 is only accepted from an Oncology Team (including breast surgeons) accompanied by appropriate clinical details.

PSA

- PSA is normally confined to the monitoring of prostate cancer. Currently we are accepting samples for the diagnosis / screening of prostate cancer.
- Rarely, PSA in females (e.g. carcinoma of periurethral (Skene's) glands).

Other Categories

- Certain other conditions which are known to be pre-malignant (e.g. various paraneoplastic syndromes).
- Friedrich's Ataxia request for AFP

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- All requests for a specific marker where cancer pathology is either established or highly likely as indicated by clinical details (e.g. HCG and AFP with clinical details “Testicular mass detected” or other “mass lesions “is allowable).

- GP requests on patients with known malignancy.

Any other requests not fitting these criteria need to be discussed on a case by case basis and will not be analysed where a clear indication is lacking. Samples are stored for a minimum of three months to allow for processing following discussions.

*5.13 THERAPEUTIC DRUG MONITORING (TDM) **

- A guide to the therapeutic drug monitoring service is given below.
- All **urgent requests**(for analysis outside the scheduled days) **must be discussed** with the laboratory on a case by case basis
- Scheduled analysis will continue on Tuesday and Wednesday for Tacrolimus and Wednesdays for Ciclosporin
- Patients on **Itraconazole** treatment must be discussed with the laboratory to arrange measurement of Ciclosporin or Tacrolimus at another site(analytical interference with Tallaght

Drug [Therapeutic Range]	**Sampling Time**	**Minimum time for sampling after dose change**	**Analysis Days**
DIGOXIN [0.8-2.0 µg/L]	Pre-dose or 6 – 8 hours after last dose	7 days	Daily (Routine Hours)
CICLOSPORIN Therapeutic ranges vary depending on transplant type and timing of sample post-transplant. Target levels and dose adjustments should be discussed with the transplant team. Early post-transplant range 100-150ng/mL Maintenance therapy range 50-100ng/mL	**Pre Dose** (trough)	Suggested 3-5 days after a dose change, initiation of therapy or initiation of an interacting medication.	Wednesday (PM))
LITHIUM [maintenance: 0.2-1.0 mmol/L; Manic phase: 0.6-1.0 mmol/L]	At least 12 hours after last dose or before next dose if BD dosing	7 days	Daily (Routine Hours)
THEOPHYLLINE [10-20 mg/L]	Trough: pre dose	SR preparations:3-6 days IV infusion: 15 hours	Daily (Routine Hours)
PHENOBARB [10-40 mg/L]	Not critical	3-4 weeks	Daily (Routine Hours)
PHENYTOIN [10-20 mg/L]	Not critical (but pre-dose recommended)	Make take up to three weeks to reach new steady state after dose change. Re-measure 7-14 days after dose change.	Daily (Routine Hours)

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Carbamazepine [4-10 mg/L] Adjust dose according to response rather than to plasma level	Pre Dose (morning)	3-4 days after dose change or 2 weeks after initiation	Daily (Routine Hours)
Tacrolimus (FK506) Therapeutic ranges vary depending on transplant type and timing of sample post-transplant. Target levels and dose adjustments should be discussed with the transplant team. Early post-transplant range 8-12µg/L Maintenance therapy range 5-8µg/L	**Pre dose(**trough)	Levels should be monitored regularly when interacting medications are added.	Tuesday (PM) Wednesday (PM)
VALPROATE 40-100 mg/L	Blood levels are not particularly useful in adjusting the dose, but they may be useful for checking compliance.		Daily (Routine Hours)

* **Refer to AMNCH Adult Medicines Guide for further information**

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5.14 REFERENCE VALUES

Adult reference values for common investigations are tabulated below. Many reference intervals depend on age, sex, diet, posture etc and the values given are for guidance only. Please contact the relevant laboratory section if you have any problems in interpretation. Please note that reference intervals for urine vary markedly with body size (hence with age and sex), and often with dietary composition as well as renal function.

Reference ranges are method dependent and can change if there has been a change in assay methodology. Changes in reference ranges will be highlighted on report forms.

REFERENCE VALUES IN CHILDREN

Please contact the laboratory for interpretation of results in children.

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5.15 INTERFERENCES

Many tests are subject to interference. This may be biological, where the offending substance alters the true concentration within the body, or analytical, where the method is not specific. Samples are checked for haemolysis, lipaemia and icterus. Interference due to these is included in the final report.
Lists of substances that interfere with each method are available in the Clinical Chemistry Laboratory. Cases of suspected interference should be discussed with the laboratory.

Some important Drug Interferences are listed in the Table below:

THIS IS NOT A COMPLETE LIST. CONTACT CLINICAL CHEMISTRY FOR FURTHER INFORMATION

Test	Interfering Substance(s)	Details	Source
Ammonia	**Sulfasalazine/Sulfapyridine**	No result produced	CCFSN_04-15 10/06/2015
AST	**Sulfasalazine/Sulfapyridine**	Interference ↓ Results	CCFSN_04-15 10/06/2015
ALT	**Sulfasalazine/Sulfapyridine**	Interference ↓ Results	CCFSN_04-15 10/06/2015
BILT	**Cyanokit**	Interference ↓ Results	Roche Safety Notice CCA_11_14 October 2015
Creatinine (Enzymatic)	**N-Acetyl Cysteine (>333mg/L)** **Rifampicin** **Levodopa** **Dexium**	Interference ↓ Results Interference ↓ Results	Roche Safety Notice CCFSN-03-15 May 2015 HPRA **SN2015(09) Issue Date: 21 May 2015**
Digoxin	Certain drugs including **hydrocortisone** therapy, **uzara** and **triamterin** may cause falsely elevated digoxin levels. Also **spironolactone** and similar drugs at high doses.	Interference ↓ Results	Method information sheet
IGE	Xolair	Do not use samples from patients under treatment with XolaiR FOR IGE analysis	Method information sheet
Lactate	**N-Acetyl Cysteine (>1497mg/L)**	Interference ↓ Results	Roche Safety Notice CCFSN-03-15 May 2015 HPRA **SN2015(09) Issue Date: 21 May 2015**
Lipids (Chol, Trig, HDL, LDL)	**N-Acetyl Cysteine**	Interference ↓ Results	Roche Safety Notice CCFSN-03-15 May 2015

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			HPRA **SN2015(09) Issue Date: 21 May 2015**
Uric Acid	**N-Acetyl Cysteine**	Interference ↓ Results	Roche Safety Notice CCFSN-03-15 May 2015 HPRA **SN2015(09) Issue Date: 21 May 2015**
Testosterone	**Nandrolone**	Strong interaction with Nandrolone. Do not use samples from patients on Nandrolone treatment.	Method information sheet
Urine Toxicology Screen	**Various**	This is an immunological based screening test and is subject to interferences. A full list of interfering substances is available on request.	Method information sheet
Cyclosporin/Tacrolimus	**Itraconazole**	Patients on **Itraconazole** treatment must be discussed with the laboratory to arrange measurement of Ciclosporin or Tacrolimus at another site(analytical interference with Tallaght	Method information sheet
Immunoassays - Cobas 8000	**Biotin > 5mg/day**	Samples should not be taken until at least 8 hours following biotin administration.	Method information sheet
Iron/TIBC/%Saturation	**Oxytetracycline,** **Iron-Supplements,** **Deferoxamine** **Ferritin (>1200ug/L)**	Oxytetracycline causes artificially low TIBC. Iron Supplements may result in falsely high TIBC. Deferoxamine binds iron and interferes. If Ferritin (>1200ug/L) – do not use TIBC or %sat results.	Method information sheet
THIS IS NOT A COMPLETE LIST. CONTACT CLINICAL CHEMISTRY FOR FURTHER INFORMATION			

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ADULT REFERENCE VALUES

Please note; Reference Values are subject to regular review and may be updated. The appropriate values are always shown on the report/

GENERAL CLINICAL CHEMISTRY – COMMON PROFILES	
RENAL PROFILE	
Electrolytes, plasma Sodium Potassium	 135-145 mmol/L 3.5-5.0 mmol/L
Urea, plasma	2.0-7.0 mmol/L
Creatinine, plasma	44 - 80 µmol/L (F) 62 - 106µmol/L (M)
LIVER PROFILE	
Bilirubin, plasma	< 17 µmol/L
ALT, plasma	M ≤ 45 IU/L F ≤ 35 IU/L
Alkaline Phosphatase, plasma	M 40 -130 F 35 – 105 (Age related variations)
Gamma GT, plasma	M <60 IU/L F <40 IU/L
Total Protein, plasma	65-85 g/L
Albumin, plasma	35-50 g/L
BONE PROFILE	
Calcium, Total and adjusted, plasma	2.15 – 2.55 mmol/L
Phosphate, plasma	0.8-1.4 mmol/L
Alkaline phosphatase, plasma	M 40 -130 F 35 – 105 (Age related variations)
Albumin, plasma	35-50 g/L

ADDITIONAL BLOOD AND URINE CHEMISTRIES	
Urate, plasma	M 200-420 µmol/L F 140-340 µmol/L
Ammonia, Plasma	F 11 - 51 µmol/L M 16 -60 µmol/L
Magnesium, Plasma	0.7-1.0 mmol/L
Bilirubin, Conjugated, Plasma	0-5 µmol/L
Lactate, Plasma	0.5-2.2 mmol/L
Lipoprotein (a)	<72 nmol/L
Osmolality, plasma	285-295 mOsm/kg
<u>24 hour Urine</u>: Sodium Potassium Calcium Phosphate Urate Creatinine Urea Protein Chloride Bicarbonate	 80-250 mmol/day 30-100 mmol/day 2.5-7.5 mmol/day 15-50 mmol/day 2.1-3.6 mmol/day 9-19 mmol/day 250-580 mmol/day <0.15 g/day 95-105 mmol/L 22-28 mmol/L

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ADDITIONAL ENZYMES	
LDH, serum	135-220 U/L
AST, plasma	M ≤ 35 IU/L F ≤ 30 IU/L
Amylase, plasma	≤ 100 IU/L
IONISED CALCIUM	
Calcium, Ionised (Balanced Heparinised Syringe)	1.15 – 1.30 mmol/L

CARDIAC MARKERS	
CK, plasma	M < 190 IU/L F < 170 IU/L
Troponin T	<14 ng/L
BNP	<300 pg/ml (Ruleout)

BLOOD GASES	
Ph	7.35-7.45
Hydronium ion concentration	35-45
PCO_2	4.5- 6.0 kPa
PO_2	11-15 kPa
Actual Bicarbonate	22-28 mmol/L
Standard Bicarbonate	21-27 mmol/L
Base excess	-2 to +2 mmol/L
Oxygen saturation	94-100%
Carboxyhaemoglobin (as % Hb)	<1% in non-smokers Up to 9% in smokers > 20%: Toxic. (Source; Tietz)

TUMOUR MARKERS	
PSA	Caucasian: 40-49 yrs - 0-2.5 50-59 yrs - 0-3.5 60-69 yrs - 0-4.5 70-79 yrs - 0-6.5
CEA	0-5 ng/ml
CA 125	< 35 U/ml
CA 15-3	< 28 U/ml
CA 19-9	< 39 U/mL
AFP	0-5 IU/L

TOXICOLOGY (Adult Decision levels)	
Paracetamol, plasma	Refer to IMB Guidelines
Salicylate, plasma	Therapeutic levels usually 150-300 mg/L Minor Toxicity 301-450 mg/L Moderate Toxicity 451-700 mg/L Major Toxicity > 700 mg/L
Ethanol, plasma	Up to 100 mg/dL: euphoric changes, some impairment expected. 100-300 mg/dL: drowsiness, confusion >300 mg/dL: impaired consciousness, coma

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ENDOCRINOLOGY	
TSH, plasma	0.3-4.2 mU/L
Free T4, plasma	12-22 pmol/L
Free T3, plasma	3.1-6.8 pmol/L
Thyroperoxidase Antibody [TPO-Ab]	Negative
Cortisol, free, 24 hour urine	<290 nmol/24h
Cortisol, plasma, at midnight	120-400 nmol/L
Cortisol, plasma, at 08:00 hrs	245-725 nmol/L
Growth hormone	<5 mU/L
IGF1, IGFBP3	See reports for appropriate age related reference ranges
FSH and LH, plasma (IU/L) Follicular Mid-cycle Luteal Postmenopausal Males	 FSH <13 LH<13 FSH <20 LH <95 FSH <8 LH<11 FSH >25 LH >55 FSH <12 LH <8
Progesterone, plasma (must be luteal phase DAY 21 sample)	>30 nmol/L indicates ovulation 5-30 nmol/L inadequate luteal phase, etc < 5 nmol/L indicates anovulation
Oestradiol, plasma (pmol/L) Follicular Midcycle Luteal Postmenopausal Males	 45-600 300-1800 160-780 <200 <160
PTH (whole molecule), plasma	15-65 pg/mL
Prolactin (Total), plasma Prolactin (Bioactive), plasma	F 100-500 mU/L M 90-320 mU/L F 75-381 mU/L M 63-245 mU/L
Testosterone, plasma Adult males Adult females	 9-29 nmol/L 0.1-1.8 nmol/L

IRON STUDIES	
Iron, plasma	M 14-31 µmol/L F 10-30 µmol/L
TIBC, plasma	50-80 µmol/L
Transferrin Saturation, plasma	M 20-50% F 15-50%
PROTEINS	
Microalbumin: *Albumin/creatinine ratio*	 M < 2.5 mg/mmol F < 3.5 mg/mmol
CRP, Plasma	<5 mg/L
Immunoglobulins	See reports for appropriate age and sex related reference ranges.

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NEUROCHEMISTRY	
CSF Glucose	2.2-3.9 mmol/L for adults 3.3-4.5 mmol/L for children (16ys<) CSF glucose values should be approximately 60% of the plasma glucose values and must always be compared with concurrently measured plasma values for adequate clinical interpretation
CSF Protein	15-45 mg/dL

LIPIDS (Desirable levels)

See table below “Management of total CVD risk – Lipids”

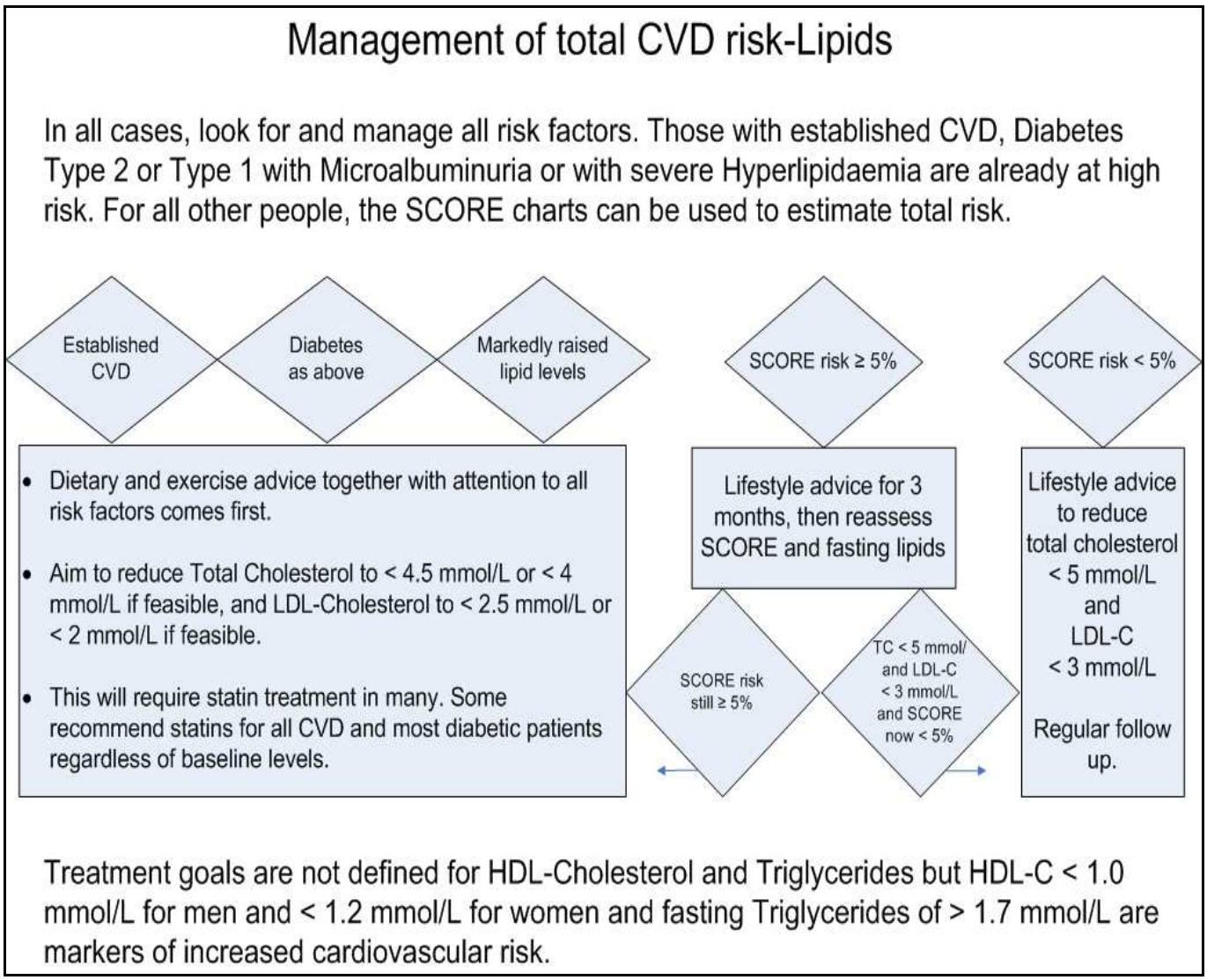
Management of total CVD risk-Lipids
In all cases, look for and manage all risk factors. Those with established CVD, Diabetes Type 2 or Type 1 with Microalbuminuria or with severe Hyperlipidaemia are already at high risk. For all other people, the SCORE charts can be used to estimate total risk.
Established CVD
Diabetes as above
Markedly raised lipid levels
SCORE risk ≥ 5%
SCORE risk < 5%
• Dietary and exercise advice together with attention to all risk factors comes first.
• Aim to reduce Total Cholesterol to < 4.5 mmol/L or < 4 mmol/L if feasible, and LDL-Cholesterol to < 2.5 mmol/L or < 2 mmol/L if feasible.
• This will require statin treatment in many. Some recommend statins for all CVD and most diabetic patients regardless of baseline levels.
Lifestyle advice for 3 months, then reassess SCORE and fasting lipids
Lifestyle advice to reduce total cholesterol < 5 mmol/L and LDL-C < 3 mmol/L
Regular follow up.
SCORE risk still ≥ 5%
TC < 5 mmol/ and LDL-C < 3 mmol/L and SCORE now < 5%
Treatment goals are not defined for HDL-Cholesterol and Triglycerides but HDL-C < 1.0 mmol/L for men and < 1.2 mmol/L for women and fasting Triglycerides of > 1.7 mmol/L are markers of increased cardiovascular risk.

Table adapted from; “European guidelines on cardiovascular disease prevention in clinical practice”. See document for details and SCORE charts.

http://www.escardio.org/guidelines-surveys/esc-guidelines/GuidelinesDocuments/guidelines-CVD-prevention-ES-FT.pdf

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5.16 *Use of HbA1c as a diagnostic test for diabetes in adults*

The WHO (2011) Diabetes Guidelines for the first time permits the use of HbA1c as a diagnostic test for diabetes in certain circumstances (www.who.int/diabetes/publications/diagnosis_diabetes2011/en/index.html). This should simplify the diagnosis particularly of the very common Type 2 Diabetes in adults and hence we are implementing this strategy at Tallaght Hospital.

In combination with judicious use of plasma glucose measurements, this should also obviate the need to perform Glucose Tolerance tests in these patients except in rare circumstances.

Initial Testing Recommendation

Initial testing in **non-pregnant adult patients suspected of having type 2 diabetes** should now include **a Fasting Venous Plasma Glucose and concurrent HbA1c measurement** Patient selection may be further refined by using a type 2 diabetes risk-assessment questionnaire such as FINDRISC (see: www.diabetes.fi/en/finnish_diabetes_association/dehko/publications)

Diagnosis

A:- Symptoms

When classic symptoms of hyperglycaemia are present, any **ONE** of the Laboratory measurements **(B)** is sufficient to establish the diagnosis (and usually the quoted thresholds are significantly exceeded).

In the absence of classic symptoms, **ANY TWO** of the Laboratory measurements **(B)** may be used to establish the diagnosis of diabetes.

B:- Laboratory Data Diagnostic Cut-points for diabetes (WHO-2011):

IFCC HbA1c ≥ 48 mmol/L (6.5%)

Fasting Venous Plasma Glucose ≥ 7.0 mmol/L

Random Venous Plasma Glucose ≥ 11.1 mmol/L

HbA1c

For HbA1c, a value of **≥** 48 mmol/mol (6.5% in the old units) using an IFCC-standardised method (as pertains in any accredited laboratory in Ireland) is recommended as the cut-point for diagnosing diabetes.

A number of exclusions apply where HbA1c measurement is not suitable (see list) however in the vast majority of cases the diagnosis of diabetes can be established on the basis of plasma glucose measurements without recourse to Glucose Tolerance testing.

List of exclusions (do not rely on HbA1c testing for diagnosis)

- All children and young people
- Patients of any age suspected of having Type 1 diabetes
- Patients with symptoms of diabetes for less than 2 months

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- Patients at high diabetes risk who are acutely ill (e.g. those requiring hospital admission)
- Patients taking medication that may cause rapid glucose rise e.g. steroids, antipsychotics
- Patients with acute pancreatic damage, including pancreatic surgery
- In pregnancy
- Presence of genetic, haematological and illness-related factors that influence HbA1c and its measurement (e.g known haemoglobinopathy, altered red cell survival)

See Guideline for comprehensive information.

Glucose Tolerance Testing

As a result of these changes, we will not be providing an open access service for GTTs. All requests for GTT will need to be discussed in advance of ordering with the Chemical Pathology team.

Intermediate Findings and Areas of Uncertainty

As with plasma glucose measurements at present, intermediate findings also occur commonly with use of HbA1c for diagnosis. Most patients with abnormal glucose or HbA1c values which fall short of diabetes are likely to benefit from lifestyle and other interventions as for existing pre-diabetes management. Further information and suggested approaches can be found in the Guideline. We are also happy to answer any queries you have on these patients by contacting us or the diabetes team.

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HAEMATOLOGY

6.0 HAEMATOLOGY

6.1 HAEMATOLOGY PERSONNEL

Prof. HELEN ENRIGHT	Consultant Haematologist	**Haematology**	3912
DR. JOHNNY MCHUGH	Consultant Haematologist	**Haematology**	3913
DR. RONAN DESMOND	Consultant Haematologist	**Haematology**	4132
	Registrar	**Haematology**	3937 bleep 6258 or bleep 7025
MS. DYMPNA MURPHY	Chief Medical Scientist		3909
MS. THERESE DRISCOLL	Senior Medical Scientist	Routine Haematology	3961
MS. LORRAINE MC MAHON	Senior Medical Scientist	Coagulation	3963
MS. BRONA MAGUIRE	Senior Medical Scientist	Special Haematology	3960
MS. JACKIE DALE	Administrative Assistant Grade V		3932
		Result Enquiries	3933/3959

Insert (01) 414 before extension number for direct access from outside or (01) 4142000 (for hospital switch) and ask for extension or bleep number.

6.2 NORMAL HOURS AND DEADLINES FOR ROUTINE ANALYSIS

- Monday – Friday 8am-8pm, – Routine testing on samples received by 3:30pm.
  (Between 8am-9am and 5pm-8pm only emergency samples will be processed)
- Saturday – 9am-12:30pm
- Outside these hours an emergency on-call service is available for all urgent requests, see section 6.4. Non urgent requests will be stored at 4^0C (if applicable) and processed the following routine morning.

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6.3 REQUESTING INVESTIGATIONS

MINIMUM LABELLING REQUIREMENTS

There is a requirement for a minimum of two acceptable identifiers on both sample and request form.

Acceptable identifiers are:

- Primary identifier – Full Patient name
- Secondary identifiers:
  - MRN (when available)
  - Date of Birth

Other information which should be included with the request:

- Date and time of sample collection
- Destination for report
- Requesting clinician name and contact details
- Patient address (if MRN not available)
- Patient gender
- Priority status
- Sample type
- Tests requested
- Identity of person taking the sample
- Relevant clinical details

SAMPLE REJECTION CRITERIA

Test requests may be rejected if the following situations apply:

- Sample types not compatible with tests requested.
- Significant difference between patient identifiers on sample and corresponding request form.
- MRN provided does not match the other details on the request form.
- Samples that do not have at least two acceptable identifiers.
- Sample volume inappropriate where applicable
- Samples which are past the recommended time from phlebotomy to analysis
- Expired sample collection tubes
- Samples received after cut-off time which require separation (e.g. Special coagulation investigations)
- Where sample quality would affect analysis e.g. haemolysis for coagulation investigations
- Test requests which are not considered relevant based on clinical information provided.
- Haematinic requests over the weekend or public holiday

SPECIMEN COLLECTION AND PACKAGING

Specimen collection should comply with requirements stated in the Specimen Guide. Specimens together with the Request Form should be placed inside a plastic biohazard bag and dispatched to the Laboratory.

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HEALTH AND SAFETY

Standard precautions should be observed when handling all pathological material. Specific instructions for sending radioactive samples are available in the local rules.

RETROSPECTIVE REQUESTING (ADD-ON REQUESTS)

In some cases, further tests on a specimen that is already in the laboratory may be added to the request. Only the requesting doctor or person nominated by them may request additional testing. Please contact the relevant laboratory section to add on test requests.
Analyses for additional tests are subject to stability of analyte as follows:

EDTA samples: 24 hours post phlebotomy
Infectious mononucleosis screens: 3 days post phlebotomy
Sickle cell screening: 3 days post phlebotomy
Coagulation tests: 6 hours post phlebotomy
D dimer: 24 hours post phlebotomy
Fibrinogen: 24 hours post phlebotomy
Haematinics: 3 days if sample supplied in gel tubes, otherwise 24 hours post phlebotomy
Reticulocytes: 24 hours post phlebotomy
Blood film: 24 hours post phlebotomy (morphology may not be reportable)

RESULTS, ENQUIRIES, TECHNICAL AND CLINICAL ADVICE

Haematology General Enquiries/result enquiries: 3933/3959

- Advice on interpretation of results, sampling & storage procedures and frequency of requesting will be directed to the appropriate person.
- Clinical advice & information for users of laboratory services on medical indications and appropriate selection of available procedures should be sought directly from the Clinical Haematology Team.

6.4 EMERGENCY ON-CALL SERVICES FOR HAEMATOLOGY & BLOOD TRANSFUSION

*Haematology & Blood Transfusion

Monday to Friday: 8 pm – 8 am

Saturday 12.30 pm –Sunday 9 am

Sunday + Bank Holiday: 9 am – 8 am

Emergency On – Call Bleep 7281

*On – Call Service covers **both** Haematology and Blood Transfusion Departments.

The Scientist On-Call MUST be bleeped when

Urgent Samples are being sent during On-Call periods.

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STAFF COMPLEMENT:

Up to Midnight = 2 Scientific Staff
Midnight – 8 am = 1 Scientific Staff

URGENT TESTS AVAILABLE ON CALL

- Full Blood Count
- Differential
- PT / INR
- APTT /APTT Ratio
- Fibrinogen
- D-Dimers
- Hb S Screen (when indicated)
- Malaria Screen (only rapid diagnostic test performed out of hours. Examination of thick and thin films including speciation will be carried out on the next routine working day)
- Myoglobin (serum & urine)

Other requests may be facilitated, after clearance with the Haematology Consultant on-call, and appropriate arrangements made with the laboratory.

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6.5 DIVISION OF SERVICE

	Routine Haematology	Coagulation	Special Haematology
Senior Medical Scientist	Ms.Therese Driscoll	Ms. Lorraine McMahon	Ms. Brona Maguire
Phone Ext. No.	3961	3963	3960
	Assays Covered	**Assays Covered**	**Assays Covered**
	Full Blood Count	PT / INR	Bone Marrow Examination including cytochemistry
	Differential White Cell Count	APTT / ratio	Immunophenotyping for Lymphoma / Leukaemia diagnosis / monitoring.
	Peripheral Blood Film Morphology	Thrombin Time	Heinz Bodies
	Reticulocyte Count	D-Dimers	Serum Ferritin
	E.S.R.	Fibrinogen	Vitamin B12
	Infectious Mononucleosis Screen	Hyper-coagulation Screen*****	Serum / Red Cell Folate
	Malaria Screen / Blood Smear for Parasites	Hypo-coagulation Screen *****	Hereditary Haemolytic Anaemia Investigations
	Sickle Cell Screen	Coagulation Factor Assays*****	PNH Screen
	Urine/Serum Myoglobin	Coagulation Factor Inhibitor Assays*****	Urine Haemosiderin
	Haemolytic anaemia screen	Protein C levels in Meningococcaemia*****	
		Antithrombin therapy in L aspariginase therapy ****	
		Heparin Induced Thrombocytopenia Screen (HITS)	

***** These samples **should not be sent** in the Pneumatic Tube System

Please use **separate** Request Forms for each section within the Haematology Department when OCS is not available

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6.6 SAMPLE REQUIREMENTS /CONSIDERATIONS FOR REFERRED TESTS

- Cytogenetic requests for Haematological malignancy must arrive in the lab by 3pm Thursday at the latest. Cytogenetic requests cannot be accepted on Fridays.
- T & B lymphocyte subset investigations must arrive in the lab before 2.15pm daily.
- Plasma viscosity: phone ahead before taking the sample to make arrangements with referral lab.
- Samples for coagulation must be received before 3.30pm Mon-Fri.
- Oxidative burst tests must be pre-arranged with St. James' Immunology Dept. and must be received in Lab before 9am.
- Hereditary Haemochromatosis Screening – request should be accompanied by "Patient Information Request Form" (available from Haematology Laboratory)

For more details on availability, sample requirements and special considerations for referral tests, including turn-around times, please contact the haematology lab.

6.7 TURN AROUND TIMES

We will endeavor to meet the following standards, subject to availability of sufficient staff and other resources including the Order Communications System (OCS).
Reporting of results may take longer pending further investigation of initial results.
Reporting of results may also take longer during on-call periods, depending on the work load.

URGENT REQUESTS (ROUTINE INVESTIGATIONS)	TURN AROUND TIMES
Haematology (Full blood count)	1 hour of receipt
Coagulation	1 hour (Excluding D dimer) of receipt
INR (Warfarin Clinic)	90 minutes

NON URGENT REQUESTS	TURN AROUND TIMES
Routine Haematology	within 3 hours of receipt, subject to cut-off
Routine Coagulation	within 2 hours of receipt, subject to cut-off (excluding D dimer)
Haematinics	within 8 hours of receipt, subject to cut-off (excluding Red Cell Folate)

Above tables refer to routine In Patient investigations only. Requests from GPs and Out Patients may take longer. For specialised assays/requests see specific details in following tables.
Turn-around times for examinations referred to external laboratories will be provided by the external laboratory directly. Contact ext. 3961/3962 for details.

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6.8 SAMPLE REQUIREMENTS /CONSIDERATIONS

SAMPLE VOLUMES

- It is preferable that blood tubes, especially those containing preservatives, are filled to their stated capacity. This avoids any risk of insufficiency or interferences from excess concentrations of preservative.This is mandatory for some tests, e.g. Coagulation based tests and ESRs, where the increased / decreased anticoagulant concentration that results from under / over filling would invalidate the test.
- Special paediatric coagulation tubes are suitable for routine coagulation investigations only.
- See following tables for special conditions/handling requirements/notes for individual tests
- For more details on availability and special considerations for referral tests, including turn-around times, please contact the haematology lab (4143961)

6.8.1 ROUTINE HAEMATOLOGY

Assay		Sample Type	Special Conditions/sample handling requirements	TAT
Full Blood Count #		EDTA Purple		Urgent 1 hour Routine 3 hours
Differential White Cell Count #		EDTA Purple		Urgent 1 hour Routine 3 hours
Peripheral Blood Film #		EDTA Purple		2 routine working days
Reticulocyte Count #		EDTA Purple		Urgent 1 hour Routine 3 hours
E.S.R.		Sodium Citrate Black	Small label on the top of inner tube must be labelled with one form of patient id. Do not stick addressograph labels along the length of the inner tube.	24 hours
Infectious Mononucleosis Screen #		EDTA Purple		24 hours
Malaria Screen / Blood Smear for Parasites #		EDTA Purple	Must contact lab before sending sample. Fresh sample to be sent without delay to the laboratory.	
Sickle Cell Screen #		EDTA Purple		8 hours
Urine Myoglobin		Urine		8 hours
Haemolytic anaemia screen	FBC/Film/Retic/ DCT	2 x EDTA Purple DCT performed in blood transfusion		Urgent 1 hour Routine 3 hours
	Haptoglobin	1 x Serum Red		3 weeks
	Urine haemosiderin	Urine		2 days

#: 1 EDTA specimen is sufficient to perform FBC/Diff/Blood Film, Infectious Mononucleosis Screen, Sickle Cell Screen and Retic Count. All of the above samples may be sent in the Pneumatic Tube System (PTS).

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6.8.2 ROUTINE COAGULATION LABORATORY

ALL COAGULATION SAMPLES MUST BE RECEIVED WITHIN 4 HOURS OF PHLEBOTOMY

Assay	Sample Type	Special Conditions	TAT
Coagulation Screen	Sodium Citrate Blue	State if patient is on Warfarin +/or Heparin	Urgent 1 hour Routine 2 hours
PT / INR	Sodium Citrate Blue	State if patient is on Warfarin.	Urgent 1 hour Warfarin Clinic 90mins Routine 2 hours
APTT / ratio	Sodium Citrate Blue	State if patient is on Heparin.	Urgent 1 hour Routine 2 hours
Thrombin Time	Sodium Citrate Blue	Only when specifically requested by the Haematology team	3 hours
D-Dimers	Sodium Citrate Blue	Should only be requested once daily in cases of suspected DVT & DIC. Not appropriate for GP patients.	3 hours
Fibrinogen	Sodium Citrate Blue		Urgent 1 hour Routine 2 hours

All of the above samples may be sent in the Pneumatic Tube System (PTS).

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6.8.3 SPECIAL COAGULATION LABORATORY

SPECIAL CONDITIONS

****NB**** The following tests **MUST NOT** be sent in the Pneumatic Tube System (PTS). Samples must be sent without delay to the laboratory.

The following tests should only be requested following consultation with the Haematology team or Laboratory. Please state family/clinical history and anticoagulant status.
Samples for special coagulation requests must be received **by 3.30pm Mon-Fri.**
For more details on availability and special considerations for referral tests, including turn-around times, please contact the coagulation lab (4143963).

Assay	Sample Type	Special Conditions	Turn-around Time
Hyper-Coagulation Screen (Thrombophilia screen)	6 x Sodium Citrate Blue 1 x Serum Red 2x EDTA Purple	6 weeks post acute event	12 weeks
Hypo-Coagulation Screen (Intrinsic & Extrinsic screens)	6 x Sodium Citrate Blue		12 weeks
Coagulation Factor Assays	2 x Sodium Citrate Blue		Dependent on specific Factor
Coagulation Factor Inhibitor Assays	2 x Sodium Citrate Blue		12 weeks
Lupus Anticoagulants	3 x Sodium Citrate Blue		12 weeks
Platelet Function Investigations	6 x Sodium Citrate Blue		12 weeks
Heparin Induced Thrombocytopenia Screen (H.I.T.S)	3 x Serum Red	4T score form MUST be filled out, contact Coag lab for a copy of this form	4 hours; 12 weeks if further investigations required
Anti Factor Xa	2 x Sodium Citrate Blue	Contact Consultant Haematologist before requesting this test	
Protein C levels in Meningococcaemia	1 x Sodium Citrate Blue		4 hours
Antithrombin levels in L Asparaginase therapy	1 x Sodium Citrate Blue		4 hours

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6.8.4 SPECIAL HAEMATOLOGY LABORATORY

For more details on availability and special considerations for referral tests, including turn-around times, please contact the special haematology lab (3960).

Assay	Sample Type	Special Conditions	PTS	Turn-around time
Haptoglobins	EDTA Purple Or Serum Red		Yes	3 weeks
Bone Marrow Examination	Bone Marrow spread on glass slides(1)(2)	Label slide with PENCIL only. Full name and MRN required.	No	12 weeks
Immuno-phenotyping for Lymphoma / Leukaemia diagnosis / monitoring.	RPMI and Heparin. 2 ml BM / PB in 10 ml RPMI / EDTA	In consultation with Haematology team or laboratory	No	48 hours
CSF analysis for lymphoma/leukaemia monitoring	CSF in sterile container (no additive) (2)	In consultation with Haematology team or laboratory. Sample should arrive in lab before 4.45pm	No	48 hours
PNH	PB EDTA Purple	In consultation with Haematology team or laboratory	Yes	48 hours
Vitamin B12	Serum Red		Yes	8 hours
Serum Folate	Serum Red		Yes	8 hours
Red Cell Folate	EDTA Purple	Not appropriate if patient was recently transfused	Yes	10 days
Ferritin	Serum Red		Yes	8 hours
Urine Haemosiderin	Urine	Early morning specimen required.	Yes	2 days
Hereditary Haemolytic Anaemia Investigation	Varies depending on Investigation	In consultation with the Haematology team or laboratory.	No	Varies depending on investigation

(1) Slides should be made using a **minimum** volume of the bone marrow aspirate (1 small drop). To avoid dilution of the sample, the total volume drawn should fill the nozzle of the syringe only.

(2) Please contact the Haematology team (bleep 7025/6258) for instructions and advice on taking CSF & BMA samples.

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6.9 REFERENCE INTERVALS

REFERENCE VALUES IN CHILDREN

Please contact the laboratory for interpretation of results in children

REFERENCE VALUES IN ADULTS:

Adult reference intervals for common investigations are tabulated below. Many reference intervals depend on age, sex, and other variables and the values given are for guidance only. Please contact the relevant laboratory section if you have any problems in interpretation.

Reference intervals are method dependent and can change if there has been a change in assay methodology. Changes in reference ranges will be highlighted on report forms.

ROUTINE HAEMATOLOGY		
PARAMETER	**UNITS**	**ADULT REFERENCE RANGE**
RED CELL COUNT	$X10^{12}$/l	M 4.5 - 6.5 F 3.8 - 5.8
HAEMOGLOBIN	g/dl	M 13.0- 18.5 F 11.5- 16.5
HCT	L/L	M 0.380 - 0.510 F 0.360 - 0.460
MCV	fl	80 - 96
MCH	pg	27.0 - 34.0
MCHC	g/dl	31.0 - 36.5
RETICULOCYTE	$X10^9$/l	35.2 -122.8
PLATELET COUNT	$X10^9$/l	150 – 450
WHITE CELL COUNT	$X10^9$/l	4.0 - 11.0
NEUTROPHILS	$X10^9$/l	2.0 - 7.5
LYMPHOCYTES	$X10^9$/l	1.5 - 4.0
MONOCYTES	$X10^9$/l	0.2 - 0.8
EOSINOPHILS	$X10^9$/l	0.04 - 0.4
BASOPHILS	$X10^9$/l	0.00 - 0.1
ESR	mm/hr	M 1 - 10 F 1 – 15

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COAGULATION		
PARAMETER	**UNITS**	**ADULT REFERENCE RANGE**
PT	Seconds	9.6 – 11.8
APTT	Seconds	20.8 – 30.8
FIBRINOGEN	g/l	1.5– 4.0
D DIMER	ug/ml	<0.42 normal reference range <0.40 cut off for exclusion of DVT in conjunction with Wells Score
FACTOR II:C	IU/ml	0.91 – 1.37
FACTOR V:C	IU/ml	0.84 – 1.57
FACTOR VII:C	IU/ml	0.72 – 1.61
FACTOR VIII:C	IU/ml	0.55 – 1.40
FACTOR IX:C	IU/ml	0.62 – 1.26
FACTOR X:C	IU/ml	0.81 – 1.44
FACTOR XI:C	IU/ml	0.69 – 1.37
FACTOR XII:C	IU/ml	0.61 – 1.72
ANTI THROMBIN	IU/ml	0.87 – 1.19
PROTEIN C	IU/ml	0.70 – 1.50
PROTEIN S (Free Antigen)	IU/ml	M 0.76 – 1.42 F 0.64 – 1.20

NOTE: For all other special coagulation assay reference intervals please contact Coagulation laboratory at ext 3963

HAEMATINICS		
PARAMETER	**UNITS**	**ADULT REFERENCE RANGE**
SERUM FOLATE	ng/ml	3.3 – 17.2
RED CELL FOLATE	ng/ml	138 – 615
FERRITIN	ug/ml	14-200
VITAMIN B12	pg/ml	200 – 660

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BLOOD TRANSFUSION

7.0 BLOOD TRANSFUSION

7.1 INTRODUCTION

The Blood Transfusion Laboratory is located in room 3.5/05 in Laboratory Medicine. This laboratory provides blood, blood components and products for hospital patients. The various therapeutic and diagnostic services provided are listed below.

If you have any questions about Blood Transfusion phone 3964/3965.

Information on Blood Transfusion can be found in:

Policy on Administration of Blood and Blood Product in Adults & Children in Tallaght Hospital (PPC-HAE-POL-009)and Transfusion Guidelines are available on Q Pulse via computers in all clinical ward areas and on Blood Transfusion intranet page

Patient Information Leaflets are available on the clinical ward areas, from Haemovigilance Department and on the Blood Transfusion intranet page.

Intranet –All information on safe transfusion practice is available on: *Blood Transfusion Intranet Site*.

Better Blood Transfusion E-Learning – there is an on line teaching programme available on the Blood Transfusion Intranet site titled Learnprouk. Go to home page or http://nhs.learnprouk.com

Clinical advice on issues concerning Blood Transfusion is available from the Haematology team 24 hours a day.

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7.2 CONTACT NUMBERS / PERSONNEL LIST

POSITION:	NAME:	CONTACT NUMBER:
Consultant Haematologist (Head of Department)	**Prof. Helen Enright**	Ext 3912
Consultant Haematologist	**Dr Johnny Mc Hugh**	Ext 3913/3966
Consultant Haematologist	**Dr. Ronan Desmond**	Ext 4132
Registrars		Bleep 6258 or 7025
Routine Laboratory	**Routine Laboratory**	Ext 3964 / 3965 (08:00-17:00)
On Call	**On Call**	Bleep 7281
Chief Medical Scientist	**Mr. Gerry Judge**	Ext 3910
Senior Medical Scientist		Ext 3998 / 3999
Haemovigilance Officer	**Mary Judge CNM II**	Ext 2437 Bleep 2111
Haemovigilance Officer	**Helen Byrne CNM II**	Ext 2372 Bleep 2110
Blood Delivery Porter	**Blood Delivery Porter**	Bleep 7266

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7.3 SERVICES & PRODUCTS & TURNAROUND TIMES

SERVICE/ PRODUCT	WHEN AVAILABLE	SAMPLE REQUIRED	TURNAROUND TIMES NOTES/SPECIAL REQUIREMENTS
▪ **Group +Save** (INAB Accredited Test) ▪ **Group** (INAB Accredited Test) ▪ **Crossmatch** (INAB Accredited Test)	**Routine Requests** Mon-Fri 09:00-15:45 Sat 09:00-11:00 **Urgent Requests** at all times	6ml EDTA Blood Sample (pink Top Bottle)	For ***routine requests***, results/blood will be available same day if received before 15:45 or by 12:00 next routine morning if received after 15:45 For ***urgent requests*** results/blood will be available in 4 hrs. If required sooner the lab must be phoned by the requesting doctor. Results/blood will be available in 45-60 mins. Emergency **uncrossmatched** blood available within 10 mins If a departure from M.S.B.O.S.* is required a telephone request must be made by a member of the surgical team to a member of the blood transfusion staff. ***AVAILABILITY OF CROSSMATCHED BLOOD WITHIN THE STATED TIME FRAME DEPENDS ON COMPATIBILITY TESTING AND AVAILABILITY OF COMPATIBLE BLOOD.*** **Note:** Expiry date on pack - In some instances this may be the same day it was ordered for.
Platelets	Routine + Urgent	6ml EDTA Blood sample - unless valid sample in lab	Can take at least 1- 2 hours or longer to get Platelets from the IBTS. Phone request well in advance of time required. Only ordered on named patient basis. No in-house stocks. Usually expires at midnight on day it was ordered for.
Frozen Plasma	Routine + Urgent	6ml EDTA Blood sample - unless valid sample in lab	Available within 50 mins. Check suitable sample is available in laboratory. Has expiry of 8 hours once thawed.

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SERVICE/ PRODUCT	WHEN AVAILABLE	SAMPLE REQUIRED	TURNAROUND TIMES NOTES/SPECIAL REQUIREMENTS
Albumin	Routine + Urgent	none	Available within 40 minutes Phone request in advance
Cryoprecipitate	Not routinely available	6ml EDTA Blood sample - unless valid sample in lab	Contact Haematology team if cryoprecipitate is indicated
Anti –D	Routine + Urgent	6ml EDTA Blood sample	Available within 40 minutes Check Rh D group and antibody screen result.
Evicel	Routine + Urgent	none	Phone lab in advance. Available within 40 minutes. See product insert for expiry once thawed
Issue of Coagulation Factors Concentrates **e.g. Fibrinogen Concentrate/ Prothrombin Complex Concentrate**	Discuss with Haematology Medical Team if required. Available in 40 mins if in stock otherwise it will take longer. Check with Laboratory staff.		
Cold Agglutinin Screen	Mon-Fri 09.00-15:45	One 6ml clotted Blood sample **without gel**	The clotted sample must be kept at 37°C. Heatblock is stored in the Immunochemistry Laboratory, Clinical Chemistry Department, Room A1Lab 0236 3.5 27. Bring to transfusion lab immediately. Results available 2 days from receipt. Clotted sample tubes without serum gel separator are available in Blood Transfusion.
Direct Coombs Test (INAB Accredited Test)	Routine & Urgent	6ml EDTA Blood Sample (pink top bottle)	Routine results available same day if received before 15.45 Routine results received after 15:45 will be processed on the next routine working day. Urgent results available within 4 hours

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SERVICE/ PRODUCT	WHEN AVAILABLE	SAMPLE REQUIRED	TURNAROUND TIMES NOTES/SPECIAL REQUIREMENTS
Transfusion Reaction Investigation	Urgent	One 6ml EDTA Blood sample + One 10ml clotted Blood sample + First voided urine specimen post incident. + peripheral blood cultures to microbiology + FBC + Liver and Renal Profile LDH + Haptoglobin, IgA levels.	• Stop Transfusion • Contact Blood Transfusion Laboratory and Haemovigilance Officers (bleep 2110/2111) • .Fill out "Report of Suspected Adverse Transfusion Reaction and Request Form". This is available in the Blood & Blood Product Transfusion Record and Prescription Form. Please ensure the request for transfusion reaction investigation is signed by a medical doctor involved in the patient's care. • Return all blood Components and administration set and above form to the Blood Transfusion Laboratory. • Routine Blood Transfusion Serology investigation results available same day if received before 15.45. Otherwise next routine day by 13.00. • Urgent investigation results available in 4 hours. • Please inform scientist on call at bleep 7281 if outside routine hours. • Other investigations e.g., cultures, IgA levels can take much longer. Phone specific laboratory for turnaround time details.
HLA typing for all potential transplant patients (bone marrow) **Disease Association Tissue Typing** **Leucocyte Antibodies Platelet Antibodies**	Mon-Thurs 09:00-15:45	10mls (minimum) Citrated/ EDTA Blood sample 10mls minimum Citrated/ EDTA Blood sample 10ml clotted Blood sample	External laboratory tests. Fill in appropriate request forms Results reported when available. (Up to 3 weeks.) **N.B.** Contact transplant co-ordinator/ Haematology/ Oncology Results available in 3 weeks approximately Results available in 3 weeks approximately

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SERVICE/ PRODUCT	WHEN AVAILABLE	SAMPLE REQUIRED	TURNAROUND TIMES NOTES/SPECIAL REQUIREMENTS
IBTS Reference Centre Serological Investigation and or Crossmatch	Weekdays	10 ml EDTA Blood sample	Samples with complex serological patterns are referred to IBTS. Results or blood are available in one to two days but can take longer depending on complexity. Please send samples to Blood Transfusion Laboratory as early as possible.
Tissue Typing & Virology Testing for Organ Donation/ Renal Transplantation		20mls minimum Citrated Blood sample + 2 x10 ml clotted Blood sample	External Lab Test Beaumont Hospital Results not returned to Tallaght Hospital

*M.S.B.O.S. – Maximum Surgical Blood Ordering Schedule

The Blood Transfusion Department complies with the International Standard ISO 15189 (Registration Number 213 MT), and the regulations, policies, and terms and conditions of the Irish National Accreditation Board (INAB) and requirements of Irish Medicines Board which is the competent authority for Blood Transfusion. The Irish National Accreditation Board (INAB) is the national body with responsibility for accreditation in accordance with the relevant International Organisation for Standardisation ISO 17000 series of standards and guides and the harmonised EN 45000 series of European standards.

7.3.1 Emergency Blood Management Group

In the event of extreme shortage of blood the hospital EBMG will meet. The aim of this group is to ensure the effective use of available blood when blood stocks have fallen to pre-specified critical levels nationally. The group can be chaired by the Consultant Haematologist and has members from interested parties e.g. Surgical, Medical etc. Further details are available on the Intranet.

7.4 OPENING HOURS

- Blood Transfusion Laboratory is opened :
    - Monday – Friday 08:00 - 20:00
    - Saturday – 09:00 -12:30
- ***Routine testing*** is carried out between :
    - 09:00 – 17:00 (Mon-Fri) - Samples must be received by Blood Transfusion Laboratory no later than ***15:45*** (in order for testing to be completed by 17:00)

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- 09:00 – 12.30 - Samples must be received by Blood Transfusion Laboratory no later than ***11:00*** (in order for testing to be completed by 12:30).
- All samples received after stated cut off times will be processed by 12pm on the next routine working day.

- Between 08:00 – 09:00 and 17:00 – 20:00 only emergency samples will be processed and telephone queries will be taken.

- Outside these hours an emergency on-call service is available for all urgent requests, Bleep 7281.

- Specimens from patients for elective surgery must be received in the Blood Transfusion laboratory not later than 15:45 on the last normal working day prior to the scheduled operation. If a definite date for operation is not known a 'Group + Save' specimen should be sent to the laboratory. A Group & antibody screen will then be performed and sample stored. The stored sample can be used for crossmatch for up to 72 hours (3 days). **A new sample is required if the patient is discharged or if 72 hours has elapsed since the sample was taken**

- Consent forms are not required and patients do not have to adhere to special instructions before samples are collected.

- Where possible order blood or blood products during 09:00 – 15:45 Monday to Friday. Keep out of hours and weekend orders to a minimum. Order blood on a Friday to cover weekend. Haemoglobin, and other Haematology values should be checked in morning and blood/product ordered e.g. fibrinogen concentrate. This reduces out of hours testing and transfusion.

- Before issuing blood the laboratory checks that the blood group of a current sample matches that of previous sample(s) (historical group). If this is the first group and save sample received and there is no historical group available on file, a second sample should be sent for confirmation of the ABO group where this does not impede delivery of blood to the patient.

Note: Repeat samples are required every 72 hours (3 days) on patients receiving regular Transfusions

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7.5 Blood Transfusion Request Card

A completed request form must be forwarded to the Blood Transfusion Laboratory and accompany the sample.

- It is important to fill in details accurately and legibly. Addressograph labels are acceptable on the request forms only.

- Fill out all details on form, as follows:

Patient Details:	*Full name, Date of birth, Hospital number and gender **must be stated otherwise the request form is rejected awaiting correction or new form**. Addressograph label is acceptable but ensure you hand write the Consultant and Ward as this information is not on the label. Tick if patient Day case or in patient*	
Clinical Details:	**Primary diagnosis**	This assists laboratory in blood selection for the Patient.
	Surgical Procedure	Some surgical procedures require crossmatched blood others do not. The number of units to request is listed in the suggested Maximum Surgical Blood Order Schedule contained in this manual.
	Blood Group	This section collects transfusion history on patient. Fill in information as is available.
	Haematology value	E.g. Hb, Platelet count, Coag Screen Results etc.
Test Required:		
	Group and Save	This is a blood group and antibody screen and sample is saved in case a crossmatch is required later.
	Group and Crossmatch	This is a Group, Antibody Screen and Crossmatch. This should be ticked if you are going to transfuse a patient or for a surgical procedure check the M.S.B.O.S to find out how many units to request. If in doubt contact the Scientist (3964/3965).
	Other	This is for requesting another test e.g. DCT, cold agglutinins or ADD-ON request for blood or blood products
Product Amount and Special Requirements:	Record the number of units required and product type **It must be clearly stated on the request form if CMV Negative or Irradiated products are required for particular patients.**	
Routine	**Routine means the sample will be processed the same day if received before 15:45 or next working day if after 15:45**	

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Urgent	**Urgent means the sample will be processed as soon as possible after receipt and results/blood will be available within 4 hours (depends on availability of blood)** **If results/blood is required sooner the requesting Doctor must contact the Blood Transfusion Laboratory explaining the urgency.** **If required, results/blood can be made available in 45-60 minutes.** **If already on Group and save, blood can be available in 35-45 minutes.** **Frozen plasma and other blood products can take up to 50 minutes.**
Date & Time Required	Record date and the time of start of operation. Be aware that if sample is received after cut off time blood may not be ready at the time required. If not for a procedure, record the time you want to commence transfusion. The use of terms such as "ASAP" and "STAT" are not recommended unless followed by speaking to a Medical Scientist.
Requesters Signature	**Doctor or authorised Nurse must sign the request *otherwise the request form is rejected awaiting correction or new form***
I have taken this sample	**This section must be filled in by person taking the blood *otherwise the request form is rejected awaiting correction or new form*. This may or may not be the same person that requested the tests.** **If not completed the testing will not proceed and a new form and sample may have to be sent. It is allowable for the person to come to the lab and fill in the details retrospectively.** **This section does not have to be filled in for ADD-ON requests as a sample is already in Laboratory**

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7.6 IDENTIFYING THE PATIENT

Correct hospital patient identification is essential to ensuring patient safety.

All patients having samples taken should wear an identity bracelet.

Positively identify the patient verbally too (if possible), confirm the first name, surname and date of birth and check against the ID bracelet. This is essential to ensure patient safety and to prevent errors.

Patients, who are unconscious, confused, undergoing general anaesthesia, all unaccompanied minor and patients whose first language is not English **Must** wear two identity bracelets.

Refer to policy on patient identification (Ref: PPC-DG-POL-022) on Tallaght Hospital intranet under Hospital Policies through Q Pulse.

7.7 TAKING THE SAMPLE

The Person taking the sample is responsible for identifying the patient. The sample must be labelled at the patient bedside. See Sample Labelling below.

Adhere to standard infection control precautions Management of Infection Prevention and Control ENV-GUI-13. Wear personal protective clothing as required.

7.8 SAMPLE LABELLING

Once the sample has been taken the tube must be labelled immediately, at the patient's bedside, by the person who took the sample. All samples must be hand labelled and signed.
Note: Please do not label samples with fine/felt tip pens as these tend to smudge.

- Sample tubes must not be pre labelled.
- PIMS/Addressograph or Key Order Coms labels must not be attached to the sample.

The sample MUST be labelled with the following essential information taken from the identity bracelet.

- Patients Surname and First name (do not use abbreviations e.g. Mgt instead of Margaret)
- Medical Record Number (Hospital number)
- Date of birth,

and

- Signature of person taking the sample

In addition gender, date and time of collection and location should be entered

Information on patient's identity bracelet and sample must be identical.
All writing on sample must be clear and legible.

Note: Samples not meeting these minimum requirements will not be accepted. Corrections cannot be made to the labelled sample.

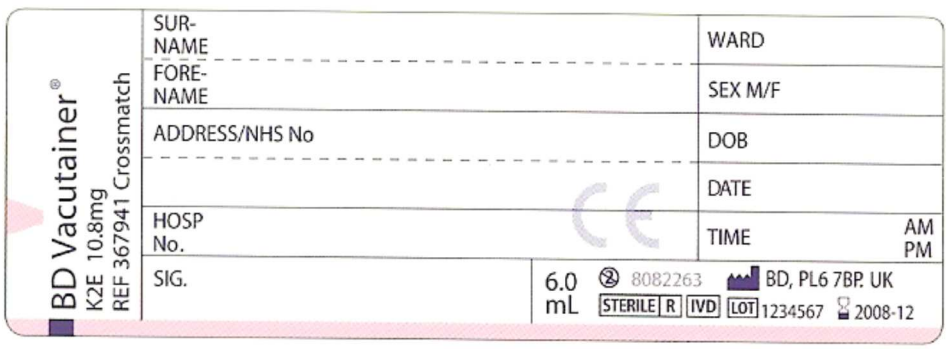

Fig1: Label on tube used for Group & Crossmatch

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7.9 MINIMUM SAMPLE LABELLING ACCEPTABLE FOR UNIDENTIFIED PATIENT'S / EMERGENCY SITUATIONS

- Medical record number
- Gender
- Date & Time sample taken
- Signature of person taking the sample, all hand labelled.
- To be accompanied by a completed request form.

The above sample must be accompanied by a completed request form which should include an approximate age if possible.

7.10 SENDING THE SAMPLES TO LABORATORY

- Use Blood Transfusion PTS 005 or use hospital porter phone 3503.
- Always place sample in plastic biohazard bag to protect the carrier, the general public and staff in the Blood Transfusion laboratory.
- Samples should be sent to the Blood Transfusion as soon as possible after taking.
- Samples can be transported at room temperature.
- Samples received 24hrs after taking will be rejected.
- Samples received in the laboratory are recorded in the Laboratory Computer System.
- Following testing the sample is stored in the laboratory at 4^0C for at least 72 hours (3 days).
- Referral samples are sent intact to the referral laboratory.

7.11 ROUTINE REQUESTS

- See section 7.4 on Blood Transfusion laboratory opening hours for routine requests.

- Requests on patients receiving ongoing Albumin treatment e.g. from Dialysis should be written on a blood transfusion request form. Order sufficient quantity to cover out of hours/weekend.

- Samples from patients who attended Orthopaedic pre-assessment Clinic (as documented in list sent by CNM in pre-assessment) and due for surgery on Monday should be received by the Blood Transfusion Laboratory by 19:00 Sunday evening. This does not apply on a Bank Holiday Monday.

- If the transfusion or operation has been cancelled or rescheduled inform the blood transfusion Laboratory. Otherwise staff will continue working on the request and blood might be wasted.

- Platelets: see section 7.3 above Services, Products and Turnaround Times.

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7.12 URGENT REQUESTS

Urgent means the sample will be processed as soon as possible after receipt and results/blood will be available (if compatible) within 4 hours (depends on availability of blood). Urgent requests are for unavoidable medical/surgical emergency e.g. patient bleeding

However if results/blood are required sooner the requesting Medical Doctor must contact the Blood Transfusion Laboratory explaining the urgency.

- Blood/results can be made available in 45-60 minutes or sooner if a Group and Save sample is available in the Blood Transfusion Laboratory.

- Frozen plasma and other blood products can take up to 50 minutes with the exception of Platelets (platelets are ordered from the IBTS on an individual basis – please see section 7.3).

Note: A delay in providing compatible blood or other blood product may occur due to a positive antibody screen.

A second sample may be requested if additional testing is required due to positive antibody screen or grouping anomaly.

Notes:

- Request for some Blood Components / Products such as coagulation factor concentrates must be done in consultation with the Haematology Medical Team.

- All Blood Components / Products issued from Blood Transfusion Lab will be labelled with Tallaght Hospital compatibility labels.

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Absolute Emergency Requests for Uncrossmatched Red Cells

Requests for uncrossmatched blood must be made by a medical doctor. If the laboratory has a current valid sample from the patient ABO and Rh D group specific blood can be given. If there is no current sample, O Rh D Negative will be issued.

In Emergency Situations:

ABO + Rh D group of patient **unknown**	___	Uncrossmatched O Rh D Negative blood can be requested by Medical Doctor
ABO + Rh D group already confirmed i.e. group + save on **current sample**	___	Uncrossmatched ABO + Rh D (i.e. patient Group Specific) blood can be requested by Medical Doctor.

ABO and Rh D group specific blood cannot be issued without a current valid sample.

Emergency O Rh D negative blood stock (up to 6 units) is available in Blood Transfusion Lab at all times. To get these delivered contact portering on bleep 7266 or 7264 and the Blood Transfusion Laboratory (3965/3964 routine hours or bleep 7281 out of hours)

7.13 REQUESTS FOR ADDITIONAL EXAMINATIONS, BLOOD COMPONENTS/PRODUCTS

The additional examination pertinent to Blood Transfusion is a request for blood or blood products. Red cells, Platelets, Frozen Plasma and other blood products/components can be requested by completing a Blood Transfusion Request form. In the section Tests Required (other) write ADD-ON. Fill in the form with exception of sample taking details on bottom right. The laboratory can be phoned to inform staff of request, however verbal requests without an ADD-ON are not processed until the ADD-ON form is received. Turnaround time for ADD-ON requests is as described in 7.3 above. Try to avoid out of hours transfusion. Orders for additional blood should be made during routine working day

- Ext. 3964 , 3965 to Bleep 7281 (out of hours)
- An Add On crossmatch may be requested using the Blood Transfusion request form if a suitable valid sample is held in the laboratory. Samples are held for 72 hours (3 days).
- The following details must be filled out on the request form :
  - Patient's name, hospital number and date of birth
  - Location of patient i.e. ward. It is very important to inform the Laboratory of the current location of the patient. The patient may have been moved to different ward since the original Group and Save request was sent to Blood Transfusion.
  - Blood Component / Product, amount required, date and time required, reason for transfusion, any special requirements (e.g. CMV- / irradiated)
  - Name of requesting medical doctor (printed and signed), IMC and bleep number

Please note: In the event of a massive transfusion a single add on request form which contains the patient details as described above and states 'Add On- Massive Transfusion' and includes the requesting doctors signature, IMC and bleep number is sufficient to cover all orders for that patient made by telephone to the lab.

7.14 PRESCRIBING BLOOD COMPONENTS AND PRODUCTS

All blood components and products must be prescribed on the Blood and Blood Product Transfusion Record and Prescription Record (Purple Document)

- The prescription must contain the following patient identification details (minimum):
  - Full name
  - Date of Birth
  - Medical Record Number

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- Gender

- The prescription must be completed by a medical doctor. It must specify the following details:

  - Date on which the transfusion is to commence
  - The component / product required
  - Special requirements e.g. CMV- or gamma irradiated
  - Number of units required
  - Rate of transfusion (routine transfusion – 4hrs for 1 unit of red cells)
  - Reason for transfusion / current haematology value (if available)
  - Prescribing doctors signature, IMC number and bleep

- A prescription can be cancelled by drawing a line through it. It must be clearly signed and dated by the medical doctor cancelling the prescription. Prescriptions are valid for 48 hours.

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7.15 DELIVERY OF BLOOD TO THE CLINICAL WARD AREA

A designated Blood Porter is available 24hrs a day on bleep 7266.

In addition the portering supervisor can be contacted on bleep 7264.

- To request delivery you will need the following details:

  - Patient Name
  - Medical Record (Hospital) Number
  - Clinical Ward area
  - Product type e.g. red cells, platelets
  - Your name

Speak clearly so there is no confusion about patient details.

These details are recorded on a telephone request docket.

- If you cannot contact 7266, phone 3964 / 3965 Mon-Fri 09:00 - 17:00 Sat 09:00 -12.30 Bleep 7264 out of these hours.
- Do not order blood to be delivered to the ward unless you have a patient cannula in place.

- Blood will be delivered to the clinical area on a single unit basis as required. Requests for more than one unit must be made by contacting the lab 3964 /3965. Bleep 7281 on call.

- It is important that the person who orders the delivery of blood/blood product is available to receive it at the clinical ward area, or in cases where this is not possible, a nominated person should be present to receive the delivery.

- A Crossmatch Report Chart Copy will accompany the first unit of blood to clinical area. Place this report in the patient chart. This copy will cover any subsequent units on the same report.

- Blood must be transported in blood transport boxes provided by the Laboratory.

- It is important that transfusion of blood components/products does not continue past the stated expiry date/time on the unit. Therefore the transfusion of a blood component / product due to expire at 12 midnight must not commence unless it can be completed or the transfusion stopped before 12 midnight.

- All blood / products must be signed for in the appropriate sign-out registers in the blood transfusion laboratory. This should only be done by staff who have received training from the Blood Transfusion Laboratory.

- Inform the Blood Transfusion Laboratory if blood/blood product is not going to be used on the date and time indicated on the request. The laboratory can then allocate the blood to another patient or place it back in stock. This is important to reduce wastage and optimise use of the product.

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Delivery of Blood in Blood Cool Box

- In emergency situations where 2 or more units are required at the patient's bedside, blood is transported in a Blood Cool Box. This can store a maximum of 6 units of red cells.
- The Blood Cool box will be accompanied by a Blood Cool Box Record Form BT-M-DC-090. Information on the date and time the box was packed will have been completed by laboratory staff. This form **must be signed** by the staff member receiving the delivery.

- The box must not be opened unnecessarily. All documentation should be kept in the plastic pocket attached to the outside of the transport box.

- The Crossmatch Report Chart copy must be signed, dated and the time recorded when removing blood from the Blood Cool Box.

- It is important to return the transport box within the specific timeframe stated on the form i.e. within 4 hours of time packed.

- If returned to the laboratory containing blood, the relevant section in Blood Cool Box Record Form BT-M-DC-090 regarding storage of blood in the Blood Cool Box must be completed. It is important to store units in the transport box at all times. If blood has been stored incorrectly (i.e. not in the box at all times), this must be documented and laboratory staff informed.

Blood must never be stored in any ward fridge

7.15 RETURN OF UNUSED BLOOD PRODUCT/COMPONENTS TO LABORATORY

- It is essential for accurate record keeping, reduction of wastage and to allow traceability that all unused blood or blood products are returned to the laboratory. Bleep Blood Porter (7266) or porter supervisor (7264) to arrange return.

- Please arrange return to the laboratory within 30 minutes of sign out time from monitored laboratory fridge.

- Blood out of fridge >30 minutes can not be re-refrigerated but still must be returned to the blood transfusion laboratory.

7.16 THEATRE BLOOD FRIDGE

A monitored blood fridge is located in theatre, specifically for theatre use. Crossmatched blood is transferred from the blood transfusion laboratory fridge to this fridge when requested by the theatre staff. Only units of red cells are placed in the fridge.

Theatre fridge has an Electronic Blood Tracking System (EBTS) kiosk fitted which should be used to transport red cells into and out of theatre fridge. This kiosk is linked to the Blood Transfusion Laboratory by an interface which transmits patient information associated with individual red cell units which ensures the correct unit is collected and transfused.

Access to red cells in the theatre fridge is granted to trained authorised personnel only via 2D barcodes on staff swipe cards.

Any medical or nursing staff removing blood from the fridge must carry with them some relevant patient documentation to facilitate input of patient details. They should also receive training from the Haemovigilance Officers on the use of theatre fridge.

In order to collect a unit from the fridge:

- Scan 2D barcode on swipe card
- Select 'Taking Out' – Room Temperature
- When prompted press 'Select Patient' and enter the patient MRN. Confirm patient details.
- Select unit from fridge and scan barcode.
- Log Out
- Take corresponding Crossmatch Report Chart Copy with you to be placed in patient chart

In order to return a unit to the fridge:

- Scan 2D barcode on swipe card
- Select 'Putting in'
- Scan unit number and place back into the fridge
- Log out

There is an Emergency Access function available on the EBTS kiosk. This should only be used when you cannot gain access to the fridge using a swipe card in order to remove units in an emergency situation. If the Emergency Access is used contact the Blood Transfusion Laboratory as soon as possible.

The EBTS will alert the user when an established rule for a unit has been violated, e.g. when a product is out of controlled storage for too long. Please contact the Blood Transfusion Laboratory if an alert is observed.

Units are accompanied by a "Crossmatch Report Chart Copy", which is placed in the plastic pocket attached to blood fridge door, and a "Crossmatch Report Register Copy" which is placed in the Sign-out Register folder (small blue folder) located on a shelf in the

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fridge. The purpose of this is to record date and time of removal from fridge and who took the blood out (in the event that the EBTS is not working).
If EBTS is not working units can be signed out manually as follows:

- When removing Red Cells from the theatre fridge, sign, date and document time of removal for each unit taken, on the appropriate **Crossmatch Report Register Copy** in the Sign-out folder.

- Take the Chart copy with you and place in patients chart. This applies to the first unit only as for subsequent units the chart copy will already be in the chart.

- Check expiry date of the unit/product. Use the unit/product with the earliest expiry date first

All other blood components and products e.g. platelets, plasma, factors, are signed-out from the laboratory and delivered to theatre as required. They are accompanied by only the chart copy, the register copy remains in the laboratory.

It is important that transfusion of blood components/products does not continue past the stated expiry date/time on the unit. Therefore the transfusion of a blood component / product due to expire at 12 midnight must not commence unless it can be completed or the transfusion stopped before 12 midnight.

- Only blood out of the fridge for less than 30 minutes can be re-refrigerated. Use EBTS to return unit to fridge.

- Blood which is out of the fridge for greater than 30 minutes and which will not be used must be returned to the Blood Transfusion Laboratory to ensure traceability. Return to theatre fridge using EBTS and contact Blood Transfusion to arrange transport back to laboratory.

- Blood is removed from Theatre Blood Fridge by blood porter and returned to Blood Transfusion Laboratory at 08:00am seven days a week and also at 20:00 Monday-Friday.

7.17 TRANSFER OF BLOOD COMPONENTS / PRODUCTS TO ANOTHER HOSPITAL

- All Blood Components / Products leaving the hospital must be :
  - Correctly stored during transport.
  - Correctly documented to ensure traceability.

- Inform the blood transfusion Laboratory of patient transfer and of what blood components / products are required.

- Staff in the Blood Transfusion Laboratory will prepare Blood Components / Products for transfer in Blood Transport boxes.

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- The Blood Components / Products will be labelled for the patient and be accompanied by a **Crossmatch Report Chart Copy** form for red cells which will contain patient and product information. For other products the appropriate chart copy report will be sent e.g. **Platelet Report Chart Copy.**

- All blood / blood products and components transfused during transfer must have their traceability labels removed, signed, dated and **Returned** to the blood transfusion laboratory.

- It is mandatory that all blood components and products transfused are traceable. When a patient is being transferred, all components / products transfused must be documented in the Blood and Blood Product Prescription Record, all traceability labels must be completed and returned to the Blood Transfusion lab in Tallaght Hospital.

- It is the responsibility of the nurse / doctor accompanying the patient to return the Blood Transport boxes with any unused blood components / products to the Blood Transfusion lab in Tallaght Hospital along with traceability labels from any used products.

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7.18 RECEIPT OF BLOOD COMPONENTS / PRODUCTS FROM ANOTHER HOSPITAL

Any blood components / products not required immediately should be returned in original transport box, to the transferring hospital, with patient transport.

- Where this is not possible, or does not occur, please inform the Tallaght Hospital Blood Transfusion Laboratory. Send all blood components / products to the laboratory without delay.

- Any blood component / product from the transferring hospital transfused as an emergency must be prescribed and fully documented by the Medical / Surgical Team to ensure traceability. Please inform the blood transfusion laboratory and Haemovigilance officer of any such transfusions.

7.19 BLOOD ADMINISTRATION POLICY

The decision to use blood is not one to be undertaken lightly and is the responsibility of the doctor in charge of the patient. This is a branch of medicine where an error on the part of clinical or laboratory staff may have the most serious consequences. For this reason everyone completing request forms and samples should do so with particular attention to the data requested. If data is not provided correctly it will cause delays. Further information such as previous transfusions and whether there were any reactions, number of pregnancies, all helps to increase safety.

Infections and Viruses

Please refer to the patient information leaflet, which is located in all clinical areas and on the Blood Transfusion intranet page (BT-M-DC-092).

See Policy o**n the Administration of Blood and Blood Products in Adults and Paediatrics in Tallaght Hospital (PPC-HAE-POL-009).**

- All Blood Products/Components must be prescribed separately and documented in **"Blood & Blood Product Transfusion Record & Prescription record".**
- **All prescriptions are valid for 48hours.**
- Inform the patient of potential risks associated with transfusion.
- Give the patient a leaflet called "Patient Information on Blood Transfusion". Patients receiving regular transfusion may not take one every time they are transfused.
- **It is** essential that each unit transfused is properly documented.
- It is essential for Medico-legal reasons that all blood / products are traceable and their fates correctly recorded, i.e. transfused, unused etc.

Traceability

All hospitals have a legal requirement to trace each individual unit of blood components/products, whether transfused or disposed of in accordance with the EU Directive 2002/98/EC.

To meet these requirements Tallaght Hospital have a traceability procedure whereby all blood components/products have a traceability label attached to the compatibility label, detailing patient's name and Medical Record Number component/product details. There is a space for signature of the person witnessing the transfusion and the date on which it occurred.

Once the transfusion has commenced tear the traceability label from the compatibility label, sign, print name and date it and place in traceability box which is located on all clinical ward areas for traceability labels to be returned to the laboratory.

Please ensure all unused blood components/products are also returned to the Blood Transfusion Laboratory to allow complete traceability.

7.20 DISPOSAL OF EMPTY BLOOD / PRODUCT PACKS

- **Following Uncomplicated Transfusion –** Dispose at ward level, as per Infection Control Policy.
- **Suspected Transfusion Reaction -** All Blood / product packs with giving set attached must be returned to the Blood Transfusion Laboratory accompanying the relevant samples and forms.

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7.21 TRANSFUSION ADVERSE REACTIONS AND EVENTS REPORTING

In the event of a suspected transfusion reaction Refer to "**Management of Adverse Transfusion Reactions"** on QPulse: PPC-HAE-POL-010 (Adults)
PPC-HAE-POL-011 (Paeds)

Report all suspected reactions/events the Blood Transfusion Laboratory and Haemovigilance officers.

For procedures on investigating a suspected transfusion reaction, please refer to the Management of an acute transfusion reactions in Adult/Paediatric Patient Algorithms. This is located in the Blood and Blood Product Transfusion Record and Prescription Record (purple document).

Please see section 7.3 (Transfusion reaction investigation) for sample requirements.

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7.22 MAXIMUM SURGICAL BLOOD ORDERING SCHEDULE (M.S.B.O.S.)

- This is a guideline for ordering blood for surgical procedures.
- A Group and Save is where the sample is Grouped, screened for antibodies and plasma saved in advance of the proposed procedure. If the screen is negative, crossmatched blood can be provided in an emergency within 35-45minutes of a phoned request. If the screen is positive provision of blood can take longer depending on the antibody.
- Blood is not crossmatched for operations associated with little or no blood loss.
- Blood is reserved for a period of 24 hours, from 09:00 on day of operation, unless otherwise requested.
- If the Operation has been cancelled, and blood has been ordered, inform the Laboratory.

Orthopaedic Surgery			
ORIF – OTHER incl. Sacrum	G+S	ORIF – PELVIC	2 units
TKR	G+S	TKR- revision	2 units
THR	G+S	THR- revision	2 units
Bone Plating	G+S	Bone Grafting	G+S
Dynamic Hip Screw	G+S (Depends on severity of fracture)		
Girdlestone	4 units	Arthrotomy / Arthroscopy	None
Hemiarthoplasty	2 units	Discectomy	G+S
-Austin Moore Prosthesis	2 units	Laminectomy	G+S
-Thompsons Prosthesis	2 units	Leg Amputation	2 units
Fractured NECK of Femur	2 units		
Fractured SHAFT of Femur	2 units	Osteotomy	G+S
I.M nail – femur	2 units		
I.M nail – tibia and other bones	G+S		
Debridement (knee, ankle)	None	Harrington Rods	2 units
Wiring (wrist, finger, toes)	None	Spinal Fusions	4 units
MUA (Manipulation under anaesthetic)	None	Spinal Decompression	G+S
EUA (Examination under anaesthetic)	None	Shoulder surgery	G+S
General Surgery		**G. I. Surgery**	
Cholecystectomy	None	Abdominal Peritoneal Resection	4 units
Breast Biopsy	None	Gastrectomy - Partial	2 units
		- Total	4 units
Colostomy Closure / Revision	G+S	- Oesophageal	4 units
Haemorrhoidectomy	G+S	Colectomy - Partial	2 units
Mastectomy	G+S	- Total	2 units
Appendicectomy	None	Fundoplication	G+S
Thyroidectomy	G+S	Inguinal	None
Parathyroidectomy	G+S	Bowel Resection	2 units
Parotid Resection	G+S	Sigmoidectomy	2 units
Vagotomy / Pyloroplasty	G+S	Pancreatic Resection	4 units
Splenectomy (elective)	G+S	Whipples (Radical Pancreatectomy)	4 units
Ligation / Stripping of Veins	None	Pharyngo-laryngectomy	2 units
ERCP	G+S	Hepatectomy	6 units
Liver Biopsy	G+S	Exploratory Laparotomy	2 units
Liver resection	4 units		
Renal Biopsy	G+S		
Gastroscopy	G+S		
Oesophagectomy	2 units		
Laparoscopy	G+S		

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Vascular Surgery		Urology	
Angiogram	G+S	Transurethral Prostatectomy TURP	G+S
		Nephrectomy simple	G+S
		Nephrectomy radical	2 units
Carotid Endartectomy	G+S	Nephrolithotomy	G+S
Femoral Distal Bypass	2 units	Cystectomy	4 units
Lower limb bypass	2 units	Cystoplasty	G+S
Femoral Popliteal Bypass	2 units	Pyeloplasty	G+S
Aorto-Femoral Bypass	4 units	Prostatectomy Open / Radical	2 units
Aorto-Iliac Bypass	4 units	Marshall- Marchetti Urethropexy	G+S
Aortic Aneurysm	4 units (elective)	Urethroplasty	G+S
Embolectomy	G+S	Transpubic Urethroplasty	2 units
Gynaecology		**Paediatric**	
Hysterectomy - Abdominal / Vaginal	G+S	Fundoplication	1 unit
- Radical Wertheim's	4 units	Reimplantation of Urether	G+S
- Subtotal?	G+S	Intersusseption	G+S
Oophorectomy	G+S	Bowel obstruction	G+S
Ectopic Pregnancy	G+S	Pyeloplasty	G+S
		Tonsillectomy	None
Vag repair	G+S	Nephrectomy	1 unit
Laproscopic examination	None or G+S	Splenectomy	1 unit
Laparotomy	G+S	Broviacs 15kg	G+S
Repair of Rectocoele		Femoral Osteotomies	1 unit
LAVH	G+S	Laproscopic Procedures	G+S
D + C	None		

NOTES

*This MSBOS was compiled in agreement with Consultants, Surgeons, Anaesthetists and Haematologist.

* G+S describes Group and Save sample. This consists of an ABO and Rh D Group and Antibody screen for irregular antibodies. No blood is actually crossmatched The sample is held in the laboratory.

* The MSBOS can be bypassed (if clinically indicated) by phoning the Blood Transfusion laboratory at 3965.

* The term "2 units" indicates a Group & Crossmatch is performed and 2 units of red cells crossmatched.

* Blood once crossmatched is held for 24 hrs (from 09:00 of day of operation) unless otherwise instructed.

* A new sample is required for each inpatient episode.

* **Sample must be handwritten and must have the following; Surname, Forename, Hospital number Date of birth, Signature of sample taker and date taken.**

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* Sample must be in Blood Transfusion Laboratory by 15:45 on routine working day prior to the operation
*This MSBOS has been reviewed by the Hospital Transfusion Committee
Updated 2015

7.23 BLOOD COMPONENTS/PRODUCTS INFORMATION

For further information on Blood Components/Products and medical indications refer to Hospital Transfusion guidelines, on QPulse and/or BT Intranet Webpage.

All Blood Components/ Products must be prescribed in the Blood and Blood Product Transfusion Record and Prescription Record (purple document).

All Traceability labels must be completed and returned to the Blood Transfusion Laboratory.

All adverse reactions and events must be reported to the Haemovigilance Department / Blood Transfusion Laboratory.

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Blood Components/Product	General Information	Special Requirements for some patient's (Refer to Transfusion Medicine Handbook)
Red Cell Concentrate	ABO & Rh D Specific All leucodepleted	▪ CMV- ▪ Irradiated ▪ Suitable for use in intrauterine transfusion, neonates and infants under one year (1) ▪ Sickle Cell patients (2) ▪ Washed (3)
Platelet Concentrates	ABO & Rh D specific ordered on named patient basis from IBTS. All leucodepleted All irradiated Apheresis or pooled	▪ CMV- ▪ Suitable for use in intrauterine transfusion, neonates and infants under one year ▪ Washed ▪ HLA Matched (4)
Frozen Plasma (FP) LG-Octaplas Uniplas	ABO group specific Solvent detergent treated (SD) plasma pooled For use in AB patients	Not routinely used for warfarin reversal (consider use of Prothrombin Complex Concentrate) Emergency issue where patient Blood group unknown.
Frozen Plasma (Irish)	Fresh Frozen Plasma filtered Not routinely available special circumstances via Haematology Consultant.	▪ CMV- ▪ Suitable for use in intrauterine transfusion, neonates and infants under one year ▪ Cryo depleted
Human Albumin Solution	5% 500mls 20% 100mls	
Fibrinogen Concentrate	Human Plasma Fibrinogen Concentrate (factor 1) (Viral inactivation + Heat	

Blood Components/Product	General Information	Special Requirements for some patient's (Refer to Transfusion Medicine Handbook)
	Treated).	
Prothrombin Complex Concentrate Octaplex (500iv)	Human Factors II, VII, IX, X	Rapid Reversal of Warfarin effect where indicated. Consult with Haematology Team.
Cryoprecipitate (not routinely available)	ABO & Rh D Specific Pooled Product Not routinely available	▪ Suitable for use in intrauterine transfusion, neonates and infants under one year ▪ CMV- ▪ *Fibrinogen is now used (in most cases) instead of Cryoprecipitate.*
Granulocytes	Apheresis or Pooled (red cell reduced) Special order from NBC	▪ CMV-
Anti –D Immunoglobulin	Rhesonativ, 1250 units Human Plasma derived (SD Treated) Anti-D for IM use only	Most effective when given within 72 hours of sensitizing event. Check Rh D group and antibody screen.
Recombinant Factor VIIa	Recombinant F VIIa Used for Haemophilia A with inhibitors Factor VII deficiency	▪ In massive haemorrhage, can be used to treat bleeding which persists despite blood product replacement. ▪ Use in consultation with Haematology Team.
Recombinant Factor VIII	Recombinant Factor VIII Treatment of Haemophilia A	Contact Haematology Team
Recombinant Factor IX	Recombinant Factor IX Treatment of Haemophilia B	Contact Haematology Team
Von Willebrand Factor + Factor VIII.	Von Willebrand Factor + Factor VIII. (Heat treated Human Plasma) Treatment of Von Willebrand Disease and Haemophilia A.	Contact Haematology Team
Human Protein C	Can be ordered in if required.	Prescribed in consultation with Haematologist.
Fibrin Sealant	Fibrinogen & Human Thrombin Supportive treatment in surgery/suture support for Haemostasis.	Stored frozen: Therefore orders to allow defrost time.

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Components suitable for use in intrauterine transfusion, neonates and infants under one year.

General requirements are:

- Components are prepared from donors who fulfil the following criteria
- Have given at least 1 donation in previous 2 years and have tested negative in microbiology tests that were designated mandatory at that time.
- CMV Neg.
- K antigen negative (red cell components only)
- Free from clinically significant blood group antibodies
- Free from high titre Anti A and Anti B (components suspended in plasma only)
- Have not received a Blood Transfusion or organ transplant.
- Have not spent one year or more in total in the U.K.
- Have not taken aspirin in the last five days.

Components for neonates are split into pedipacks thereby providing the potential to reduce donor exposure.

(2) ***Sickle Cell Patients*** – It is desirable where time permits to select red cells matched for Rh and K antigens and which is HbS- negative, CMV- negative.

(3) ***Washed Components*** - available for patients who have had a significant reaction to plasma. No longer designated for patients with IgA deficiency.

(4) ***HLA Matched Components*** - requests directly to NBC Haematology Team for patients with suspected or confirmed HLA antibodies.

These above components are ordered as required from NBC. Please inform the Blood Transfusion Lab if your patient requires these components.

7.24 MAJOR EMERGENCY PLAN

This policy is available on QPulse ref: ORG-MD-POL-004

The hospitals response is divided into 3 phases.

Phase 1: the laboratory is not contacted.

Phase 2: (limited mobilisation) the laboratory is contacted.

Phase 3: (full hospital mobilisation) the laboratory is contacted and a number of extra staff is required to attend the hospital.

Patient Charts

The Emergency Department have charts made up to be used in event of major accident plan being implemented. These charts have a hospital number attached to a prefixed number in place of patient name. Adult charts start at A102-A201; Paediatric charts P202-P300.

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Sample Labelling

The samples taken in the Emergency Department will be labelled as follows:

- Hospital number: (from ready made up charts)
- Name: As the patients name is unknown; Use the prefixed number e.g. A102 from the chart.
- Gender
- Approximate age of patient
- Signature of person taking the sample

No addressograph labels on samples. Samples to be accompanied by a completed request form.

Blood will be provided as follows (where stocks allow):

O Rh D Negative uncrossmatched blood will be issued to all women of child bearing age and to all children.

O Rh D Positive uncrossmatched blood will be issued to all women above child bearing age.

O Rh D Positive uncrossmatched blood will be issued to all men.

When Patient Blood Group becomes available, group specific blood will be issued.

7.25 Referral Tests

A number of tests are not performed in Tallaght Hospital and are referred out for testing by external laboratories (See 7.3 Services & Products & turnaround times)

***Tissue Typing Request Form**

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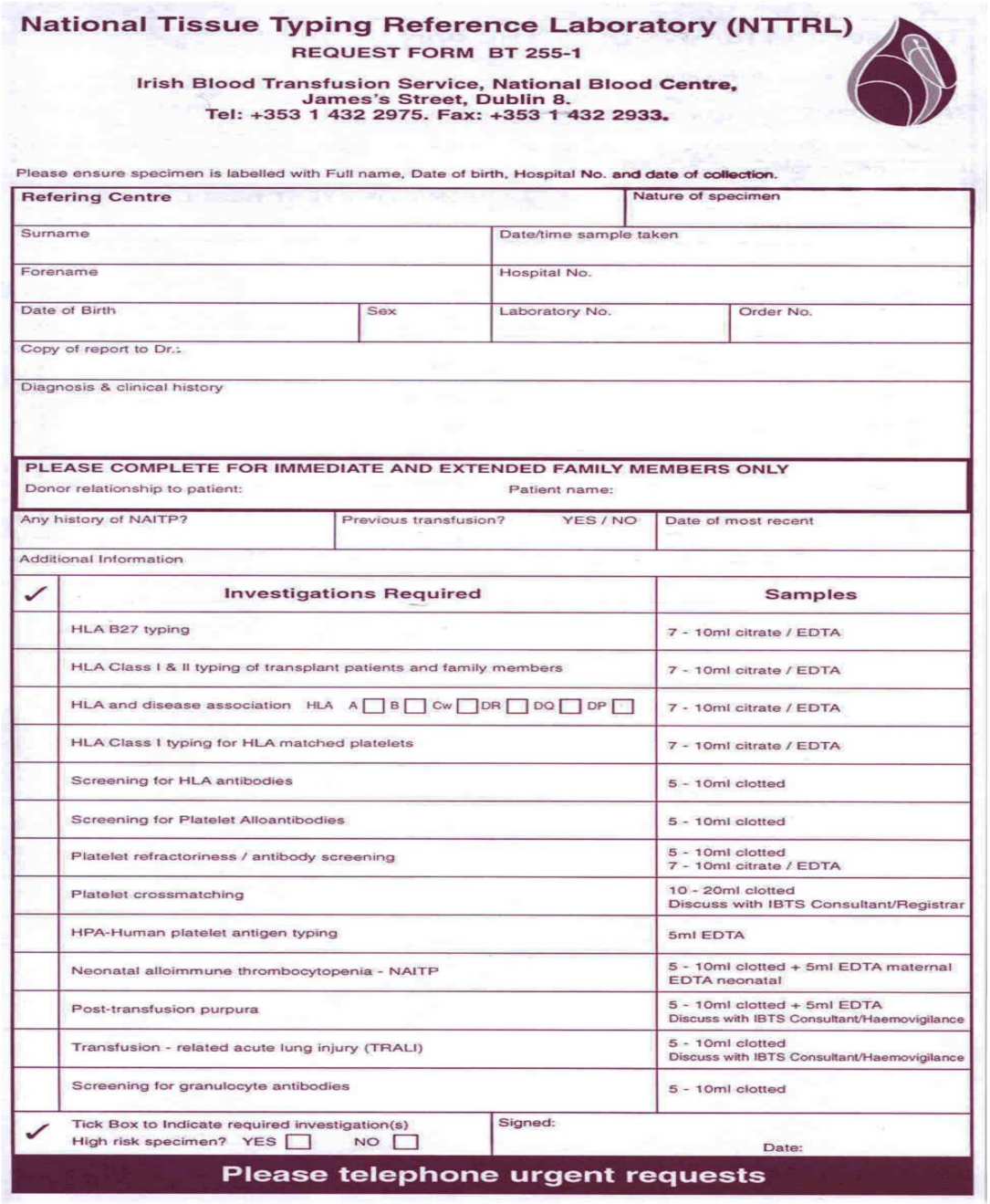

National Tissue Typing Reference Laboratory (NTTRL)

REQUEST FORM BT 255-1

Irish Blood Transfusion Service, National Blood Centre,
James's Street, Dublin 8.
Tel: +353 1 432 2975. Fax: +353 1 432 2933.

Please ensure specimen is labelled with Full name, Date of birth, Hospital No. and date of collection.

Refering Centre		Nature of specimen	
Surname		Date/time sample taken	
Forename		Hospital No.	
Date of Birth	Sex	Laboratory No.	Order No.
Copy of report to Dr.:			
Diagnosis & clinical history			

PLEASE COMPLETE FOR IMMEDIATE AND EXTENDED FAMILY MEMBERS ONLY

Donor relationship to patient: Patient name:

Any history of NAITP?	Previous transfusion? YES / NO	Date of most recent
Additional Information		

✓	Investigations Required	Samples
	HLA B27 typing	7 - 10ml citrate / EDTA
	HLA Class I & II typing of transplant patients and family members	7 - 10ml citrate / EDTA
	HLA and disease association HLA A ☐ B ☐ Cw ☐ DR ☐ DQ ☐ DP ☐	7 - 10ml citrate / EDTA
	HLA Class I typing for HLA matched platelets	7 - 10ml citrate / EDTA
	Screening for HLA antibodies	5 - 10ml clotted
	Screening for Platelet Alloantibodies	5 - 10ml clotted
	Platelet refractoriness / antibody screening	5 - 10ml clotted 7 - 10ml citrate / EDTA
	Platelet crossmatching	10 - 20ml clotted Discuss with IBTS Consultant/Registrar
	HPA-Human platelet antigen typing	5ml EDTA
	Neonatal alloimmune thrombocytopenia - NAITP	5 - 10ml clotted + 5ml EDTA maternal EDTA neonatal
	Post-transfusion purpura	5 - 10ml clotted + 5ml EDTA Discuss with IBTS Consultant/Haemovigilance
	Transfusion - related acute lung injury (TRALI)	5 - 10ml clotted Discuss with IBTS Consultant/Haemovigilance
	Screening for granulocyte antibodies	5 - 10ml clotted

✓	Tick Box to Indicate required investigation(s) High risk specimen? YES ☐ NO ☐	Signed: Date:

Please telephone urgent requests

7.25 KEY ORDER COMMUNICATIONS

Order Communications Reporting is currently available for Blood Transfusion.
Order Communications Requesting is currently **not** available for Blood Transfusion.

To view Blood Transfusion Results / Reports enter the patient's hospital number and select "Find".

When the correct patient is located choose "Results" and then "Results for a patient". Then change the Discipline selection from "All" to "Blood Transfusion". Select "Find". All results from the last 4 days should be visible (To see previous requests extend the date range of the search).

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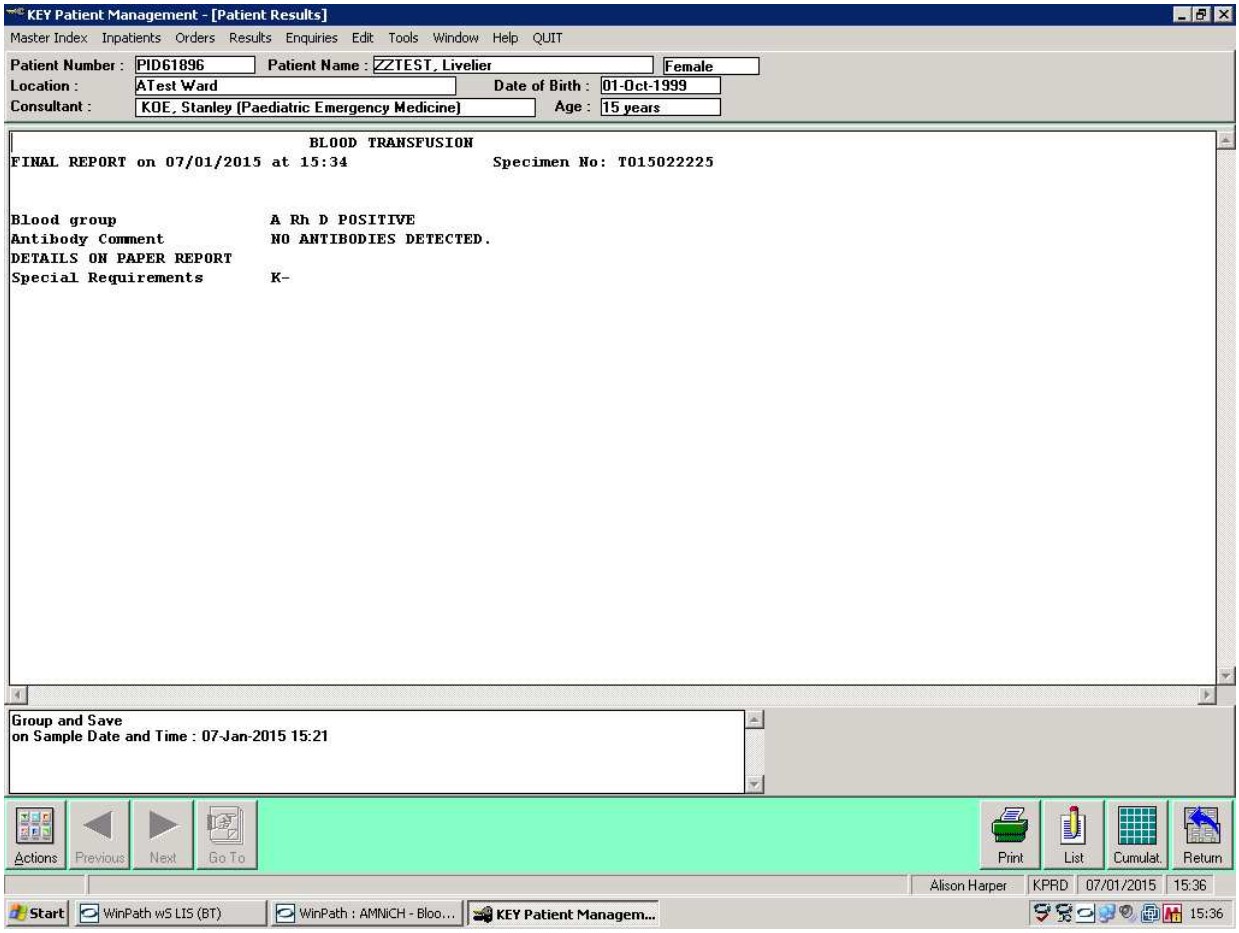
Group and Save Report

A group and antibody screen report is available on KEY OCS.
This report contains the following information:

- Patient ABO and Rhesus group
- Results of antibody screen
- Patient special requirements (if applicable)
- The date and time the sample was taken is displayed in the bottom left corner of the report. This can be used to check if a group and save sample is still valid (samples are valid for 72 hours from time taken)



Product Availability

A crossmatch report similar to the printed crossmatch report is not available on KEY OCS.
Please contact Blood Transfusion Laboratory for information on product availability.

CELLULAR PATHOLOGY

8.0 CELLULAR PATHOLOGY

The Department of Cellular Pathology provides a comprehensive **Histopathology** and **Cytopathology** service. The Department complies with the International Standard ISO 15189 (Registration Number 330 MT), and the regulations, policies, terms and conditions of the Irish National Accreditation Board (INAB).

Contact for general enquiries reports etc: 3929/3928/3985

Enquiries for clinical advice and sampling procedures will be directed to the appropriate person.

8.1 CELLULAR PATHOLOGY CONTACT NUMBERS

Key Personnel

Dr. Barbara Loftus	Consultant Histopathologist	3914
Dr. Michael Jeffers	Consultant Histopathologist	3921
Dr. Paul Crotty	Consultant Histopathologist	3915
Dr. Stephen Crowther	Consultant Histopathologist	3991
Dr. Maureen O Sullivan	Consultant Paediatric Histopathologist	01-4096100 (Our Lady's Children's Hospital, Crumlin)
Dr. Francesca Brett	Consultant Neuropathologist	3929
Dr. John O'Loughlin	Chief Medical Scientist	3992

Enquiries

Cellular Pathology Office		**3929/3928/3985**
Specimen Reception		3925
Main Laboratory		3973
Cytology Laboratory		3971
Histopathology Registrars		3922

Mortuary

Mr Anthony O'Toole	Mortuary Manager	2593
Mr Patrick Redmond Ms Bernadette Murray	Anatomical Pathology Technicians	2593 Bleep 7079

8.2 ROUTINE HOURS

Monday to Friday	09:00 – 17:00	Deadline for receipt of specimens in lab: **16:30**
Saturday AM	09:00 – 12:30	Deadline for receipt of specimens in lab: **12:00**

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8.3 SUPPLIES AVAILABLE FROM CELLULAR PATHOLOGY

The following are available from Cellular Pathology Specimen Reception (Ext 3925). A minimum of 24 hours notice is required:

- Specimen containers – various sizes
- 10% neutral buffered formalin in pre-filled 40ml containers
- 2.5% Glutaraldehyde in pre-filled vials
- Glass slides
- Plastic slide mailers
- Hanks balanced salt solution for FNA
- Post vasectomy and semen analysis kits

8.4 SPECIMEN COLLECTION AND DELIVERY

The laboratory operates a collection service at designated times from the following areas

	Theatre	Minor operations	Endoscopy	Urology
Mon-Fri 10:30	X	X	X	X
Mon-Fri 14:00		X	X	X
Mon-Fri 15:30	X	X	X	X
Saturday 10:00	X			

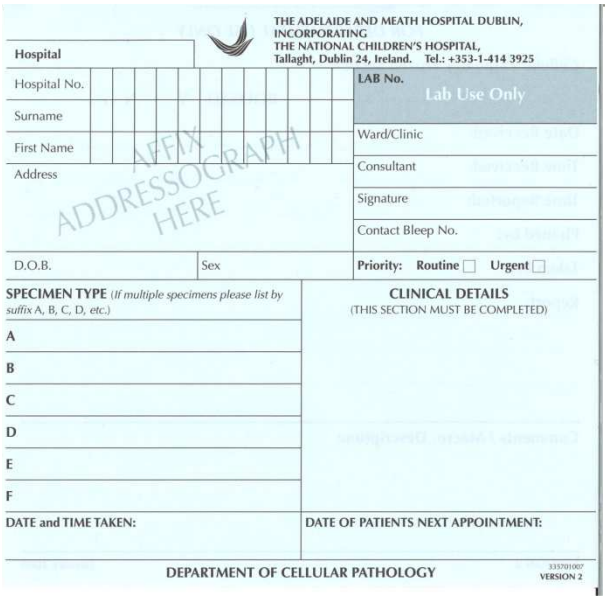
The laboratory must be notified of urgent specimens requiring collection at other times (Ext 3925).

Specimens from other areas in the hospital may be hand delivered to Cellular Pathology specimen reception.

8.5 SAMPLE LABELLING

8.5.1 Request form

All specimens **must** be accompanied by a completed Cellular Pathology or Andrology (Semen Analysis) request form (see below). Details must be legible, addressograph labels are preferable.



THE ADELAIDE AND MEATH HOSPITAL DUBLIN, INCORPORATING THE NATIONAL CHILDREN'S HOSPITAL, Tallaght, Dublin 24, Ireland. Tel.: +353-1-414 3925

Hospital | Hospital No. | Surname | First Name | Address | D.O.B. | Sex

LAB No. Lab Use Only | Ward/Clinic | Consultant | Signature | Contact Bleep No. | Priority: Routine ☐ Urgent ☐

AFFIX ADDRESSOGRAPH HERE

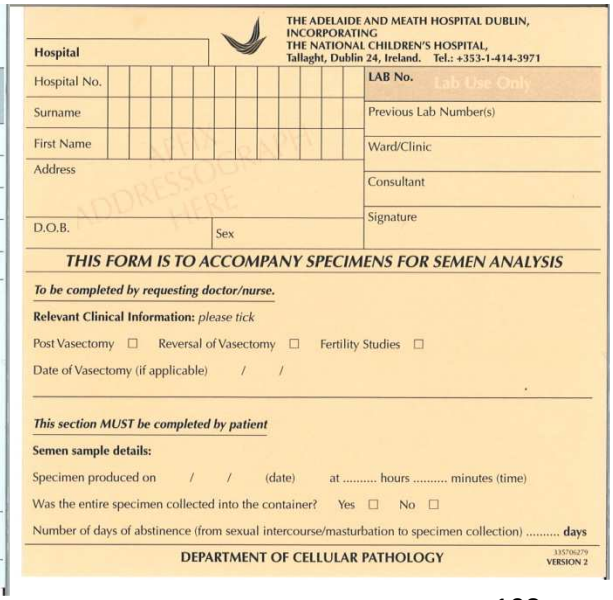
SPECIMEN TYPE (If multiple specimens please list by suffix A, B, C, D, etc.)

A | B | C | D | E | F

CLINICAL DETAILS (THIS SECTION MUST BE COMPLETED)

DATE and TIME TAKEN: | DATE OF PATIENTS NEXT APPOINTMENT:

DEPARTMENT OF CELLULAR PATHOLOGY 335701007 VERSION 2



THE ADELAIDE AND MEATH HOSPITAL DUBLIN, INCORPORATING THE NATIONAL CHILDREN'S HOSPITAL, Tallaght, Dublin 24, Ireland. Tel.: +353-1-414-3971

Hospital | Hospital No. | Surname | First Name | Address | D.O.B. | Sex

LAB No. Lab Use Only | Previous Lab Number(s) | Ward/Clinic | Consultant | Signature

THIS FORM IS TO ACCOMPANY SPECIMENS FOR SEMEN ANALYSIS

To be completed by requesting doctor/nurse.

Relevant Clinical Information: *please tick*

Post Vasectomy ☐ Reversal of Vasectomy ☐ Fertility Studies ☐

Date of Vasectomy (if applicable) / /

This section MUST be completed by patient

Semen sample details:

Specimen produced on / / (date) at ..... hours ..... minutes (time)

Was the entire specimen collected into the container? Yes ☐ No ☐

Number of days of abstinence (from sexual intercourse/masturbation to specimen collection) ..... **days**

DEPARTMENT OF CELLULAR PATHOLOGY 335706279 VERSION 2

The following mandatory details must be on the request form and sample container(s):

- Full Patient Name
- Date of Birth
- Medical Record Number (if request is on a registered patient)
- Sample type/site

Specimen Type/Site must be listed either on the container or request form.

The following details are desirable on the request form:

- Date and time of sample
- Clinical details
- Patient Location
- Consultant/Clinician Name
- Legible signature and contact number of requesting doctor
- Priority Status of Request (Routine/Urgent)
- Details of any Sample Associated Infection Risk
- Date of Patient's Next Appointment
- Patient Address (if patient has no MRN)

For completeness of the final report, clinical information provided should include sufficient detail regarding the reason for the procedure.

Failure to include any of the above information or a labelling discrepancy between the request form and container will result in a delay in processing of the specimen until the discrepancy has been rectified.

8.5.2 Sample packaging

Standard precautions must be exercised in handling and transporting all cellular pathology specimens.

Specimens for routine histology should be placed in appropriately sized, tightly sealed, approved containers with a sufficient volume of 10% neutral buffered formalin. Proper and timely fixation is a critical step in tissue preparation and the importance of this step cannot be overemphasised.

The specimen(s) together with request form must be placed in a suitable plastic pathology biohazard bag for collection.

FORMALIN IS A CATEGORY 2 CARCINOGEN.
FORMALIN AND GLUTARALDEHYDE ARE POTENT EYE AND NASAL IRRITANTS AND CAN CAUSE RESPIRATORY DISTRESS AND ALLERGIC DERMATITIS.

GLOVES, SAFETY GOGGLES AND APRONS MUST BE USED WHEN USING THESE FIXATIVES.

Personnel using formalin must be aware of the proper procedure for dealing with small or large formalin spills.

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8.6 URGENT SERVICES

8.6.1 Frozen Sections

A frozen section service is offered between 9 a.m. and 5 p.m. Monday to Friday, frozen sections outside of these hours may be provided on an individual basis by prior agreement with a Consultant Histopathologist.

Specimens from patients with risk of infection (HepB, HepC, HIV, TB etc.) and radioactive samples should not be submitted for frozen section. If a suspicion of such infection exists, the clinical staff concerned have a duty of care to inform laboratory personnel.

- If the laboratory inadvertently processes such a specimen, a decontamination procedure must be carried out on all frozen section equipment. Decontamination takes a minimum 24 hours. During this time the frozen section service will be limited or unavailable.

Booking a frozen section

- Frozen sections should be booked at least 24 hours in advance by contacting the Cellular Pathology Lab (Ext 3973) with the following details:
    - Theatre
    - Consultant Surgeon
    - Patient Name and MRN
    - Type and Site of Surgery
    - Time of surgery.

- If a frozen section is required on a specimen that has not been booked, the Laboratory must be informed by telephone (ext. 3973) as soon as possible to ensure that personnel are available to perform the frozen section.

- **The Theatre Porter or Theatre Staff must bring the fresh specimen with completed request form and <u>contact phone number</u> directly and without delay to the Cellular Pathology Laboratory.**

- The laboratory must be informed in the case of cancellation of or delay to a frozen section.

Reporting of frozen sections

The frozen section report will be phoned to the contact number supplied. Failure to supply a contact number will result in a delay in the report being communicated to the clinician. A typed report will be available following routine paraffin processing of the specimen. The turnaround time of frozen section diagnosis varies from specimen to specimen depending on the complexity of the case.

8.6.2 Other Urgent Specimens

Urgent specimens are dealt with on an individual case basis. The turnaround time of urgent cases varies according to the type of tissue to be processed, the optimum fixation time and the complexity of the case. <u>The request form for an urgent case must be clearly marked by ticking the priority status box, and the clinical details must reflect the reason for urgency. A phone or bleep number should also be provided so that the urgent report can be communicated.</u> Alternatively if a sample that has been already sent down to the laboratory subsequently becomes urgent, the main laboratory should be phoned (ext. 3973) clearly outlining the reason as to why the status of the specimen has changed, consultation with the appropriate consultant histopathologist may be required.

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8.7 SPECIMEN REQUIREMENTS

8.7.1 Histology

Test	Sample requirements	Comment
Routine histology	Specimens must be immersed in an adequate volume of 10% neutral buffered formalin in an appropriately sized container	The volume of formalin must be enough to fully immerse the specimen.
Tissue for frozen section	Must be sent fresh to the laboratory and without delay.	See section 8.6.1 above. Frozen sections must be booked in advance (Phone 3973).
Muscle / Nerve biopsy	Fresh: wrap in saline-moistened gauze. Send immediately to the lab	Clinical details are mandatory. Notify lab in advance (ext. 3973)
Skin punch for Direct immunofluorescence (DIF)	Send two samples – one fresh and one fixed in 10% neutral buffered formalin	Wrap fresh sample in saline-moistened gauze. Immediate transport to the lab.
Temporal artery biopsy	Send in 10% neutral buffered formalin, no need to send fresh	
Lymph node (possible lymphoma)	Fresh: wrap in saline-moistened gauze. Transport immediately to the lab	Notify lab in advance (ext 3973)
Radioactive Specimens (e.g. Sentinel Lymph Node)	The specimen should be clearly marked with Radioactive Stickers.	

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Test	Sample requirements	Comment
Fluorescent *in situ* Hybridisation (FISH) for detection of gene rearrangement (lymphoma)	Formalin-fixed, paraffin-embedded tissue selected by a pathologist	Available in consultation with Dr Michael Jeffers, consultant pathologist (Ext 3921)
*HER2 amplification status	Formalin-fixed, paraffin-embedded tissue selected by a pathologist	Requests for HER2 testing must be made via a consultant histopathologist
*Molecular testing e.g. EGFR, ALK, RAS, BRAF, GIST molecular analysis	Formalin-fixed, paraffin-embedded tissue selected by a pathologist	Please contact the Cellular Pathology office (Ext 3929)
*Renal Biopsies	Place in saline	Transport immediately to the lab. Must be accompanied by the multipart Beaumont Hospital request form (these request forms are not available in the lab, must be sourced directly from Beaumont Hospital). Please attach an addressograph label to **all parts** of this form. Cellular Pathology must be notified in advance when a renal biopsy is planned (Phone 3925/3973) and the sample must be received in the lab no later than **4pm** to ensure dispatch to Beaumont Hospital.
*Duodenal biopsy for disaccharidase analysis	Fresh: wrap in saline-moistened gauze. Send immediately to the lab	Samples are snap frozen and held at -70°C until a paediatric pathologist has reviewed the permanent sections and decided whether disaccharidase analysis is required
*Samples for electron microscopy eg nasal or bronchial brushings	2.5% Glutaraldehyde in 10ml bijou bottle supplied by Cellular Pathology	Please fill out “Southampton PCD diagnostics Service” form, available from laboratory
*Skin biopsy for Glutaric Acidaemia Type 1	Fresh skin biopsy in tissue culture medium (supplied by the lab)	Laboratory **must** be notified in advance (ext 3973) so that tissue culture medium can be sourced

*These samples are referred out to external institutions

8.7.2 Cytology

All non-gynae cytology samples must be received unfixed. To avoid cellular deterioration samples must be delivered to the laboratory during routine hours (09:00-16:30). Samples which cannot be transported to the lab during working hours must be refrigerated (there is a specimen fridge in the cytology lab).

Specimen and completed request form should be submitted to the laboratory in a plastic biohazard bag, please ensure that container lids are screwed tightly onto the body of the container.

Sample type	Sample requirements	Comment
*Cervical smear samples	ThinPrep® liquid based sample vials	Referred out to the Coombe Hospital
Slides	Samples may be air-dried or fixed immediately using a spray-fixative. Place slides in a plastic slide mailer labelled with patient's details.	**Patient name** and **MRN** must be clearly written in **pencil** on the frosted end of the slide. Distinguish Air-Dried slides from Spray-Fixed slides by writing AD (air-dried) or SF (spray-fixed) on the frosted end of the slide.
Sputum	Ideally an early morning, deeply coughed specimen is sent down to the laboratory on three consecutive days.	
Urine	Voided urine taken into a sterile 50ml Universal Container. The specimen should be taken from the patient approximately 3 hours after the first early morning specimen.	
Pleural/Ascitic fluid	Material should be submitted in a sterile 50ml Universal Container.	At least 20ml of sample is needed for processing. **Under no circumstances are drainage bags accepted,** please aliquot the sample from the bag into a 50ml universal container.
Bronchial Washings/ Bronchial Lavages	Material should be taken into a sterile 50ml Universal Container	

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Sample type	Sample requirements	Comment
Cyst /Fluid Aspirate	Material should be taken into a sterile 50ml Universal Container	
Bronchial/Bilary Brushings	Smear the brush end of the specimen onto labelled slides. Spray the slide with spray fixative immediately, and label the slide SF. If the slides are not to be fixed, leave to air dry and label AD. Place slides into a plastic slide mailer labelled with the patient's details. Cut the tip of the brush off and place in a sterile 50ml Universal Container filled with **Saline** (not formalin).	Using **pencil**, label the frosted end of the slide with **patient name** and **MRN**.
Cerebro-Spinal Fluid (CSF)	Ideally at least 0.5ml is required for cytological analysis	CSF for full laboratory investigation (culture, white cell count, biochemistry profiles, cytology etc) must be submitted to the Microbiology department. Samples for cytological investigation only should clearly state this on the request form and be submitted directly to Cellular Pathology.
**Fine Needle Aspirate (FNA)	The FNA sample is smeared onto glass slides which are air-dried (AD) or spray-fixed (SF). Slides are placed in a plastic slide mailer labelled with patient's details. Rinse out the syringe and needle with sterile saline or Hanks Solution (available from the cytology lab) into a labelled Universal Container. **The needle must be discarded as soon as the sample has been taken.**	**Under no circumstances should the needle used to take the aspirate be submitted in the specimen container.**

** Consultant Pathologists / SPRs attend at FNA procedures performed in the Radiology Department (to assess adequacy of the sample) by arrangement with the department of Radiology. Please phone extension 3929 (cellular pathology office) for enquiries.

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8.7.3 Andrology

Please note: There are no sample production facilities available to patients in the hospital. Please refer to the instructions contained in the Andrology pack.

A) Post Vasectomy Specimens:

These specimens are processed Monday to Friday by **patient appointment only**. Appointments are made by patients or by clinical staff at 4143971. Packs containing the specimen container, request form and instructions are available from the Cellular Pathology Laboratory. Packs are also available from the Urology Day Ward.

B) Semen Analysis Specimens:

These specimens are processed on Wednesday and Thursday mornings and are **strictly by appointment.** Appointments are made by submission of a referral letter containing the following information which must be legible:

- Patient's name
- Date of birth
- Address
- Mobile phone number
- Clinician's details

Send referral letter to:
The Andrology Department,
Cellular Pathology Laboratory,
AMNCH (Tallaght Hospital,)
Dublin 24

- On receipt of the letter an appointment will be sent out to the patient with the time and date of their appointment and when they can collect their semen analysis pack from the laboratory.

- The pack contains the specimen container, request form and instructions

- It is vital that patients follow the instructions contained in this pack. For appointment enquiries please phone 3929.

8.8 REPORTING ARRANGEMENTS

Reports are available for viewing on the ”Key“ Order Communications System (OCS) immediately post authorisation. A printed copy of the report is also generated and sent to the relevant clinical area/team.

For enquiries about reports please phone the Cellular Pathology office (Ext 3928/3929/2985)

8.8.1 Turnaround times

The following are **target turnaround times** (national guidelines are currently being established) and are subject to the factors outlined below and the impact of various resource issues. These target turnaround times have been agreed following consultation with the users of our service.

- Small biopsies
  - Inpatient – 5 working days
  - Outpatient – 10 working days
- Non-biopsy specimens – 7 working days
- Cytology specimens
  - 5 working days
  - Semen analysis and post vasectomy - 10 working days

Turnaround times refer to the availability of an authorised report for 80% of uncomplicated specimens, turnaround time may vary according to the type of specimen to be processed including requirement for decalcification, the optimum fixation time required and complexity of the case. Certain additional investigations such as special stains, immunohistochemistry etc will impact on turnaround times.

8.8.2 Turnaround times (TATs) for samples that are referred out

	Referral centre	**TAT**
Molecular testing	Cancer Molecular Diagnostics Laboratory, SJH	3 weeks
HER2 status	Histopathology, SJH	3 weeks
Muscle and nerve biopsies	Neuropathology, Beaumont Hospital	3 weeks
Renal biopsies	Renal Pathology Lab, Beaumont Hospital	3 weeks for final report
Duodenal biopsy for disaccharidase analysis	Paediatric Biochemistry/Haematology, Royal Hospital for Sick Children, Edinburgh	13 weeks
Nasal brushings for electron microscopy	Biomedical Imaging Unit/Southampton General Hospital	13 weeks
Skin biopsy for Glutaric Acidaemia Type 1	Chemical Pathology, Sheffield Children’s Hospital	13 weeks
Cervical Smear Samples	Cytology, Coombe Hospital	4-6 weeks

8.8.3 Specimen retention time and requesting additional tests

- Histology specimens are kept for approximately 6 weeks post receipt or 4 weeks following authorisation of the report.
- Cytology specimens are kept for 2 weeks post receipt.
- Paraffin blocks and stained slides are retained permanently.
- Any additional tests must be arranged through direct contact with the reporting consultant pathologist.

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8.9 CLINICO-PATHOLOGICAL CONFERENCES (MDTS)

Clinico-pathological conferences are held in the Seminar Room in the Laboratory Medicine Department and in the Seminar Room in the Radiology Department.

Details of cases for discussion (Name, MRN, Specimen Type, Date of Procedure) must be supplied to the departmental secretaries, extension number 3929/3928 at least **2 working days** before the date of the conference (See chart below). This is to allow sufficient time for slides to be retrieved from the archive and reviewed by the pathologist prior to the meeting. Recent cases may be discussed but only by prior arrangement with the Consultant Pathologist.

DEPARTMENT OF CELLULAR PATHOLOGY

CLINICO-PATHOLOGICAL CONFERENCES

Subject	Day/Time	Location	Frequency	Deadline	Co-Ordinator
GI MDT	Tuesday 7am	Radiology MDT room	Weekly	Friday 1pm	Dr. P.Crotty/ Dr. S.Crowther
Urology MDT	Tuesday 8am	Radiology MDT room	Fortnightly	Wednesday before scheduled conference	Dr. B.Loftus
Haematology MDT	Wednesday 12 noon	Radiology MDT room	Weekly	Monday 12 noon	Dr. M.Jeffers/ Dr. P.Crotty
Oncology MDT	Wednesday 1pm	Radiology MDT room	Weekly	Monday 1pm	All
Melanoma MDT	Wednesday 1pm	Radiology MDT room	Monthly	Monday 1pm	All
Dermatology	Wednesday 1.30pm	Laboratory seminar room	Fortnightly	Thursday 1.30pm	Dr. B. Loftus
Colposcopy	Monday 4.45pm	Laboratory seminar room	Monthly	N/A	Dr. M. Jeffers
GI Medical	Friday 8am	Radiology MDT room	Monthly (1st Friday of each month)	Wednesday 12.30pm	Dr.P.Crotty/ Dr.S.Crowther
IBD MDT	Friday 8am	Radiology MDT room	Monthly (3rd Friday of each month)	Wednesday 12.30pm	Dr.P.Crotty/ Dr.S.Crowther
Respiratory	Friday 10am	Radiology MDT room	Weekly	Tuesday 12.30pm	Dr.S.Crowther / Dr.M.Jeffers

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8.10 AUTOPSY (POST MORTEM) SERVICES

Autopsy services are provided by the Department of Cellular Pathology.
Autopsies may be performed at the direction of a coroner (Coroner's case) or at request of the clinician responsible for the care of the patient (Non-coroner's or House case).

Tallaght Hospital is under the jurisdiction of the Dublin Coroner, the current Dublin Coroner is Dr. Brian Farrell (telephone 01-8746684/ 01-8743006; e-mail coroners@dublincity.ie)

Coroner's cases:
Circumstances where a death should be reported to the Coroner are listed in the link below.

http://www.coronerdublincity.ie/faqs/death.htm

Post mortem reports for Coroner's cases are sent to the Coroner's office only and all related inquiries should be directed to that office.

House cases:
Cases which are being considered for a house case should be discussed with the consultant pathologist on call prior to obtaining consent. It is essential that the requesting clinician is in a position to sign a death certificate for these cases and if the cause of death is unknown, then the coroner MUST be informed.

If a house case is to be performed, written consent from the next of kin on a post-mortem examination consent form is required. This is to be obtained by the requesting consultant or a senior member of their team. Post-mortem examination consent forms are available in the mortuary or can be obtained from the cellular pathology secretariat (ext 3929)

It is the responsibility of the individual who requests the post mortem to ensure that the completed consent form, patient's case notes (to include a concise clinical summary for the pathologist) are delivered to the Mortuary in order for the autopsy to be performed. In the case of deaths occurring out of normal working hours, the individual who obtained consent for autopsy must ensure that the relevant documentation is forwarded to the Mortuary the following morning. When the autopsy is completed the Pathologist will contact the clinician with a summary of the findings. The clinician may also attend a presentation of the relevant autopsy findings if they so wish.

Under normal circumstances, a provisional report may be issued within 3 days. A final report, including results of histology, will be issued within 6 weeks. Cases requiring neuropathological or toxicological examinations may take 10-12 weeks for completion.

If there is any doubt as to whether a case requires a Coroner's or non-Coroner's post mortem, the case should be discussed with the consultant pathologist on call, who may recommend discussion with the coroner. This should be done prior to requesting permission for the post mortem from the family. In addition, scheduling of the post mortem will depend on work load within the mortuary and the cellular pathology department. Therefore the family should not be informed of a time that the autopsy will be performed, prior to discussion with the consultant pathologist on call.

If a Post Mortem (Coroner's or House case) is required, the clinical staff must also inform the Anatomical Pathology Technicians, Mr Patrick Redmond and/or Ms Bernadette Murray extension 2593/ bleep 7079.

8.9.1 PAEDIATRIC POST MORTEMS
For the National Children's Hospital (NCH) post mortems will routinely be carried out at Our Lady's Children's Hospital (OLCH), Crumlin. The pathologist on-call at OLCH must be contacted through OLCH switch board on 01-4096100 without delay when a death has occurred. In non-coroner's cases, the pathologist conducting the examination will discuss the extent of the procedure with the family.

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MICROBIOLOGY

9.0 MICROBIOLOGY

The Microbiology Department provides Bacterial, Virology, Parasitology, Mycology and Serology services. The tests available and the sample requirements are listed in the tables below. Please note *Service restrictions may apply from time to time due to staff shortages.*

9.1 MICROBIOLOGY PERSONNEL

Consultant Microbiologist	Professor Philip Murphy	Ext. 3919
Consultant Microbiologist	Dr. Susanna Frost	Ext. 3936
Consultant Microbiologist	Dr. Deirdre Brady	Ext, 3920
Microbiology Registrar		Ext. 4707
Infection Control Team	Ms. Dympna Mc Donnell Ms. Rosarii Cosgrave Ms. Terry Smith Ms. Maura Rushe	Ext. 3938/4278 Bleep 2609
Chief Medical Scientist (Acting)	Donal Smith	Ext. 3906

Microbiology: Enquires/ Secretary/ Reports/Results		**Ext. 3934/3935**
Microbiology Main Laboratory Specimen Reception		Ext. 3940
Microbiology Main Laboratory Urine, Sputa, Pus, Swabs, CSF, Mycology, Parasitology		Ext. 3941/3942
Microbiology Blood Cultures/ Serology/ Antibiotic assays		Ext. 3939
TB Laboratory		Ext. 3944
Microbiology Laboratory-Faeces/ *Cl. difficile* toxin testing, IV tips, MRSA/VRE screens, Environmental testing		Ext. 3940
Medical Scientist on-Call		Bleep 7280

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9.2 MICROBIOLOGY ROUTINE HOURS

Monday to Friday	08.00-18.00	Deadline: Deadline for reports by 17.00 Specimens in Lab by 16.30 Antibiotic assays in Lab by 15.00
Saturday a.m.	09.00-12.30	Deadline: Deadline for reports by 12.30 Specimens in Lab by 11.30 Antibiotic assay in Lab by 11.00

Routine samples arriving after the cut-off times will be analysed during the next working day

9.3 LABORATORY NOTIFICATION OF EMERGENCY WORK

DURING ROUTINE HOURS

Within routine hours, please telephone the Microbiology laboratory (Ext. 3940/3941/3942) or the **Microbiological Secretarial Office (3934/3935) from 12 midday onwards. Between 9am and 12 midday please bleep 7280 for urgent requests.**
This is **essential** to ensure that the specimen is expected and is handled as an emergency test. Please note that marking a sample "Urgent" **will not** cause it to be handled urgently unless the Microbiology laboratory has been notified.
CSF specimens, skin scrapings and Blood cultures are always processed urgently and should be delivered immediately to the Microbiology Laboratory.

OUTSIDE OF ROUTINE HOURS

The emergency service is available on a 24-hr basis and is restricted to true emergencies. Other tests may be requested but these would require validation by the laboratory medical staff on duty.

Outside normal working hours from **5pm** until **8am the following morning** the procedure is:
Contact or bleep the person on-call in Microbiology.

Microbiology Medical Scientist On-call, Bleep No. 7280, which has a voice mail facility - information on Patient name / Ward/Sample must be supplied each time the Medical Scientist is bleeped.

9.4 LIST OF TESTS AVAILABLE OUT OF ROUTINE HOURS

LIST OF TESTS AVAILABLE 5PM - 12 MIDNIGHT

1. All CSF specimens where a diagnosis of infectious meningitis is suspected.
2. All Skin scraping specimens where a diagnosis of Meningococcal septicaemia is suspected.
3. Blood cultures.
4. Urgent Tissue/Pus/Gram stains.
5. Bronchoscopy specimens requiring urgent Gram stain and culture: Contact the Consultant Microbiologist.
6. Respiratory specimens requiring urgent ZN stain. Contact the Consultant Microbiologist.
7. Urgent urine specimens i.e. one specimen per patient for microscopy and culture.
8. Emergency antibiotic assay which cannot wait until the following morning – Contact the Consultant Microbiologist.
9. Hepatitis B/C: Acute pre-dialysis patients for Hepatitis B needlestick injuries: This is available up to 10pm (see NVRL guidelines). Contact the Consultant Microbiologist.

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LIST OF TESTS AVAILABLE POST 12 MIDNIGHT

1. All CSF specimens where a diagnosis of infectious meningitis is suspected.
2. All Skin scraping specimens where a diagnosis of Meningococcal septicaemia is suspected.
3. Urgent urine specimens i.e. one specimen per patient for microscopy and culture
4. Any other tests: Contact the Consultant Microbiologist.

For specimens that cannot be sent via the Pneumatic Tube System (PTS), please contact the portering pool to transport the specimens to the Microbiology Laboratory.

9.5 CLINICAL CONSULTATION

A Clinical consultative service is available through the Microbiology Registrars and Consultants during routine hours at the above numbers and by the Consultant Microbiologist out of hours via the On-Call Medical Scientist or Hospital switch.

9.6 ROUTINE RESULTS AND REPORTING

Where VDUs are available, reports for both routine and emergency requests will be on screen in your ward as soon as they are validated by laboratory personnel. Please make use of this facility. Non-urgent phone calls create a significant workload and cause unnecessary delays in processing samples.

All positive **CSF** specimens, all **Skin Scrapings** positive for Meningococcal disease, all **positive Blood cultures**, **Mycobacteria, Salmonella, Shigella, Campylobacter, Group A Streptococcus, C. *difficle* toxin, HIV, Hepatitis, Legionella and pneumococcal urinary antigen** results are telephoned. In addition, isolates from normally sterile sites which are deemed significant by the Microbiology Registrar are telephoned.

Individual paper reports are issued for some sections. Results are also available electronically.

9.7 GUIDELINES FOR MICROBIOLOGICAL SPECIMENS

The value and reliability of the results of many diagnostic bacteriological tests is largely dependent on correct procedures being followed when tests are requested. Microbiology results depend critically on the type and quality of the material received. Therefore this material should be **representative** and **fresh**. All specimens of infectious material should have their container lids **securely tightened** prior to transportation to ensure **safe arrival** in the laboratory. **Package all specimens in a biohazard bag before being sent through the Pneumatic Tube System (PTS).**

Please inform the laboratory in advance of any 'Hot' specimens that require processing. A lead box is available in the laboratory for transport of such specimens. See Hospital Guidelines at http://intranet.amnch.ie/oldlinks.htm 'Ionising Radiation Local Rules'

TRANSMISSIBLE SPONGIFORM ENCEPHALOPATHY AGENTS (NvCJD)

Samples should be clearly marked with clinical details. **If a patient presents with a suspected TSE/CJD, the laboratory must be informed** prior to sending samples as separate protocols are required for handling these specimens.

REASONS FOR REJECTING SPECIMENS FOR BACTERIOLOGICAL EXAMINATION

- Incomplete or illegible request form

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- Improperly labelled samples and samples from patients whose details do not correspond with the request form. The sample should be labelled with two unique identifiers (Full name, Date of Birth or Hospital number). The accompanying request form should also be labelled with the corresponding details. See below.
- Specimens submitted in an unsterile container
- Tissue/ specimen received in formalin or other fixative
- Specimens which have leaked, either because the container has been damaged or the lid has not been tightened correctly.
- Unnecessary repeat requests

All non OCS specimens sent to the laboratory should be accompanied by a legible, fully completed and signed request form (YELLOW).

Information on **all** request forms should include:

1. Full patient identification data, name, sex, date of birth and hospital number.
2. Brief clinical details and history, **including date of onset**.
3. Time, date taken and nature and source of specimen including ward and consultant, or GP name and address and GP code
4. Recent and current antibiotic therapy
5. Investigation requested.
6. Name and bleep number of requesting doctor.

It is essential that all the above information is provided on a legible, fully completed and signed request form in order to maximise patient benefit. Failure to provide sufficient information may delay reporting and/ or lead to inappropriate investigation.

SPECIAL INVESTIGATIONS

All specimens undergo routine culture and sensitivity (C/S), if other specific investigations are required, please contact the Microbiology Laboratory.

REPEAT EXAMINATION DUE TO ANALYTICAL FAILURE

A repeat sample may be requested. A comment will be added to report form. The lab will also contact the source by telephone to inform them that a repeat sample is required.

REQUESTING ADDITIONAL TESTS

Bacteriology Samples

Due to the instability of bacteria over time and the processing undertaken for some samples, it is advisable that requesting additional tests on submitted samples are made as close to date of collection of sample as possible. Please phone relevant section in Laboratory with additional request. Requestor will be advised as to possibility of additional tests requests. An additional form is required. This is available from the Microbiology Laboratory.

Serology Samples

The time limit for testing blood samples for various antibodies / antigens is variable. Please contact the Microbiology Laboratory for further information.

The following pages contain guidance on the taking and submission of samples for the most frequently requested bacteriological investigations. In addition advice is always available from medical and/or scientific staff of the department, both regarding tests described and others which may occasionally be required. Please read these notes and follow the advice given.

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Turnaround times
Stated averaged turnaround times cover normal working days (Monday to Friday excluding bank holidays). The stated turnaround times may be extended outside these times.

9.8 SPECIMEN REQUIREMENTS

Please label all samples clearly with the patient's name, DOB or Hospital number, date and time collected and the specimen site.

9.8.1 Urinary Tract Infection

Test	Sample Type	Sample Volume	Special Conditions	PTS	Frequency of Test	Cut-Off Time	Turnaround Time
Urine culture & sensitivity Urgent Microscopy requests must be phoned to the Microbiology Laboratory	MSU	At least 1ml in a sterile urine container		YES	Daily	4.30pm (Mon-Fri)* 11.30 (Sat)	Microscopy: by 5pm on day of receipt Culture: 16-72 hours
	CSU			YES			
	Suprapubic aspirate			YES			
	EMU			YES			
	Bag Urine			YES			
	Pad Urine			YES			
	Clean Catch Urine			YES			
	Ileal conduit			YES			
	Cystoscopy urine			YES			
	Nephrostomy urine			YES			
	Ureteric urine			YES			

N.B. It is essential to tighten container lids to prevent leakages.
It should be stressed that urine specimens submitted for culture are screened for 'significant' growth. If a special situation is being investigated, please inform the laboratory.
It is important to instruct the patient to cleanse the genitalia before micturition for a mid-stream specimen to be collected.
Any sample which may be subjected to delay of more than 2 hours before being sent to the laboratory should be refrigerated.

* Urine specimens from adult and paediatric A/E are processed up to 5pm. For processing of urgent urine specimens outside routine hours (5pm to 8am the following morning), please contact the microbiology medical scientist on-call on Bleep 7280.

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Urine Microscopy White and Red Cell Counts are reported according to the following bands

WCC RCC	Nil	<10	10-20	20-50	50-100	100-200	200-1000	>1000

9.8.2 ENT Infection

Please label all samples clearly with the patient's name, DOB or Hospital number, date and time collected and the specimen site.

Swabs should be taken before antimicrobial therapy where possible. Specimens should be transported and processed as soon as possible. If processing is delayed, refrigeration is preferable to storage at ambient temperature.

Test	Sample Type	Sample Volume	Special Conditions	PTS	Frequency of Test	Cut-Off Time	Turnaround Time
ENT culture & sensitivity	Mouth Swab			YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours
	Eye Swab*			YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours
	Nasal Swab			YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours
	Ear Swab			YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours
	Throat Swab#			YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours
	Bordetella pertussis Perinasal Swabs		A "Bordetella pack" is available from the Laboratory	NO	Daily	4.30pm (Mon-Fri) 11.30(Sat)	Culture: 7 days

Note: A nasal swab is **not useful** for the investigation of sinusitis. Antral lavage or pus from sinus should be sent if acute maxillary sinusitis is suspected. Nasal swabs **are useful** for the investigation of carriage of Staphylococcus aureus, and Methicilin Resistant Staphyloccus aureus (MRSA).

*Specimens for Acanthamoeba investigation are referred to the Royal Victoria Eye and Ear hospital, Dublin.

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Swabs for investigation of Diphtheria should be clearly stated in the clinical details
Specimens for *Chlamydia trachomatis* investigation are referred to the National Virus Reference Laboratory. Please contact the Microbiology Laboratory for the appropriate swab required for this investigation.

9.8.3 Respiratory Tract Infection

Please label all samples clearly with the patient's name, DOB or Hospital number, date and time of collection and the specimen type.

Salivary samples are unsuitable. Purulent or mucopurulent samples should ideally be collected before anti-microbial therapy where possible. Specimens should be transported and processed as soon as possible. Sputum may be refrigerated for up to 2-3h without an appreciable loss of pathogens. Any delay beyond this time may allow overgrowth of certain organisms.
If the patient has difficulty in producing sputum, a physiotherapist can help in sputum collection, or sputum may be induced by saline inhalation.

Test	Sample Type	Sample Volume	Special Conditions	PTS	Frequency of Test	Cut-Off Time	Turnaround Time
Sputum culture & sensitivity	Sputum	At least 1ml in a sterile universal container	Please send a separate specimen for TB culture	YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours*
	Cough Swab			YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours*
	Broncho Alveolar lavage (BAL)	As large a volume as possible		YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours*
	Bronchial Aspirate	At least 1ml in a sterile universal container		YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours*
	Tracheostomy Aspirate	At least 1ml in a sterile universal container		YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours*
	Bronchial Brushes	Placed in a sterile universal container		YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours*
	Sinus Secretions	In a sterile leak proof container		YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours*
	Nasopharyngeal Aspirate	In a sterile leak proof container		YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours*

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Note: BALs are routinely cultured for bacterial pathogens as well as TB and fungi. Specimens requiring examination for *Pneumocystis jiroveci (*formerly *carinii*) are referred to Biomnis Laboratories. Requests for examination for CMV are referred to the National Virus Reference Laboratory.

* Normally culture results are available 48 hours after receipt of the sample but sputum from cystic fibrosis patients may take longer as some of the bacteria are slow growing and difficult to process.

Test	Sample Type	Sample Volume	Special Conditions	PTS	Frequency of Test	Cut-Off Time	Turnaround Time
Legionella Urinary antigen*	Urine	20ml		YES	Mon-Fri	4.30pm (Mon-Fri)	Result available on day of testing
Pneumococcal Urinary antigen*	Urine	20ml		YES	Mon-Fri	4.30pm (Mon-Fri)	Result available on day of testing

* If transportation is delayed, please refrigerate at 4º C

9.8.4 Gastrointestinal Infection

Please label all samples clearly with the patient's name, DOB or Hospital number, date and time of collection and the specimen type.
Please send separate specimens and forms for each test request. If only one specimen is received with multiple requests it will cause delays in referring specimens to external laboratories.
If transportation is delayed, please refrigerate at 4º C

Test	Sample Type	Sample Volume	Special Conditions	PTS	Frequency of Test	Cut-Off Time	Turnaround Time
Faeces culture & sensitivity	Faeces	1-2g in a sterile universal container		YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours
	Faecal Fluid	1-2ml in a sterile universal container		YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours
Ova & Parasites detection†	Faeces	1-2g in a sterile universal container	Please provide appropriate history; foreign travel etc. See Below	YES	Mon-Sat	4.30pm (Mon-Fri)	24-48 hours
Clostridium difficile toxin detection	Diarrhoeal Faeces	1-2ml in a sterile universal container		YES	Mon-Fri	9am Mon-Fri*	Result available on day of testing.
Helicobacter pylori antigen stool test	Faeces	1-2g in a sterile universal container		YES	Mon-Fri	4.30pm (Mon-Fri)	24-48 hours
Faeces for Molecular Testing	Faecal Fluid Faeces	1-2g in a sterile universal container		YES	Mon-Fri	9am Mon-Fri	Result available on day of testing.

† Please contact the laboratory for information on the appropriate specimen required for the detection of certain parasites.

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Note: The following is the acceptance and rejection criteria for specimens for C. difficile toxin testing;

- Non diarrhoeal stools are unsuitable for *C. difficile* toxin test.
- Specimens from patients less than 2 years old are not processed for *C. difficile* toxin.
- Specimens > 5 days old are unsuitable for *C. difficile* toxin test.
- If a patient has had a positive *C. difficile* test in the last 4 weeks the specimen is not processed. The assay is not a test of cure.
- If patient has tested negative in the previous 48 hours, test is not performed.

Please state on the request form whether antibiotic therapy could have induced the diarrhoea, or if pseudo-membraneous colitis is suspected.

Specimens for viral detection are referred to the National Virus Reference Laboratory. Please refer to the Referral section.

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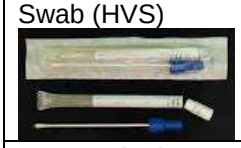
9.8.5 Genital Infections

Please label all samples clearly with the patient's name, DOB or Hospital number, date and time of collection and the specimen type.

If transport is delayed, please keep sample at room temperature.

Test	Sample Type	Sample Volume	Special Conditions	PTS	Frequency of Test	Cut-Off Time	Turnaround Time
Genital Tract Specimens Culture& sensitivity	High Vaginal Swab (HVS) 			YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours
	Low Vaginal Swab (LVS)			YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours
	Endocervical Swab			YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours
	Cervical Swab			YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours
	Vaginal Swab			YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours
	Penile Swab			YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours
	Urethral Swab			YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours
	Intrauterine Contraceptive Device (IUCD)	Send entire device		YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours
	Fluids& Pus	At least 1ml in a sterile universal container		YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours
	Tissue& biopsies	Placed in a sterile universal container		YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours

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- **Chlamydia detection- Abbott Multi Collect Transport Tubes** and sampling protocols are available on request from the Microbiology Laboratory. The specimen collection kit instructions are available from the laboratory or at the following location http://www.abbottmolecular.com/static/cms_workspace/pdfs/US/AL1036-2_PI_mw004_US_Final_v2.pdf
- Please send **vesicle/ulcer viral swab** for **herpes simplex** investigation-these specimens are referred to the National Virus Reference Laboratory. Viral transport swabs are available from the Microbiology Laboratory.
- Appropriate swabs for *N. gonorrhoeae* investigation include; urethral, endocervical, cervical, rectal and pharynx.
- A HVS swab is suitable for candida and trichomonas detection
- For the investigation of PID, please send a cervical swab
- Syphilis, hepatitis B and HIV-send serum samples (Please refer to referral and serology sections)

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9.8.6 Pus & Wound Specimens

Please label all samples clearly with the patient's name, DOB or Hospital number, date and time of collection and the specimen type.

FOR HEALTH & SAFETY REASONS DO NOT SEND PUS IN SYRINGES WITH NEEDLE ATTACHED.

Test	Sample Type	Sample Volume	Special Conditions	PTS	Frequency of Test	Cut-Off Time	Turnaround Time
Wound swabs Culture & sensitivity	Wound swabs			YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours
Pus culture & sensitivity	Pus	In a sterile leak proof container- transported to the lab within 30 mins		YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours
Fluids (non-sterile sites) culture & sensitivity	Fluids-wound/abscess/drain	At least 1ml in a sterile leak- proof container		YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours

Note: Samples of pus are preferred to swabs. Ideally, a minimum volume of 1 ml of pus should be sent. If swabs are used, sample the deepest part of the wound and soak well in pus.
Specimens should be transported and processed as soon as possible. The volume of specimen influences the transport time that is acceptable. Large volumes of purulent material maintain the viability of anaerobes for longer.

Wound or Pus samples are screened for all likely bacterial pathogens and, if present, these organisms and their antibiotic sensitivity results are reported. The inclusion of relevant clinical information on the request form assists in deciding the relevance of some bacterial isolates. If transport is delayed please, keep samples at room temperature

9.8.7 Fluids/Aspirates from Sites Normally Sterile

Please label all samples clearly with the patient's name, DOB or Hospital number, date and time of collection and the specimen type.

Test	Sample Type	Sample Volume	Special Conditions	PTS	Frequency of Test	Cut-Off Time	Turnaround Time
Fluids/ Aspirates Culture & sensitivity	Pleural Fluids†	At least 1ml in a sterile leak- proof container		YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours
	Continuous ambulatory peritoneal dialysis (CAPD) fluid	At least 20ml in a sterile leak- proof container	An aliquot of sample in an EDTA tube if cell count required.	YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours
	Peritoneal dialysis(PD) Fluid	At least 20ml in a sterile leak- proof container	An aliquot of sample in an EDTA tube if cell count required.	YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours
	Joint Aspirates*	At least 1ml in a sterile leak- proof container		YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours
	Ascitic Fluid*	At least 1ml in a sterile leak- proof container		YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours
	Bile	1-2ml In a sterile leak proof container		YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours

† All pleural fluids are sent for TB culture and sensitivity

* Requests for crystal examination on joint aspirates are performed by the Cellular Pathology department

* Ascitic fluid may be inoculated into Blood Culture bottles in acute peritonitis cases.

Notes on transport: Specimens should be transported and processed as soon as possible. The volume of specimen influences the transport time that is acceptable. Large volumes of purulent material maintain the viability of anaerobes for longer; however the recovery of anaerobes is compromised if the transport time exceeds 3 hours.
If processing is delayed, refrigeration is preferable to storage at ambient temperature. Delays of over 48 hours are undesirable.

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9.8.8 Tissues/ Biopsies & Bone Specimens/Chest Drain tips

Please label all samples clearly with the patient's name, DOB or Hospital number, date and time of collection and the specimen type.

SPECIMENS RECEIVED IN FORMALDEHYDE ARE NOT SUITABLE FOR CULTURE.

Test	Sample Type	Sample Volume	Special Conditions	PTS	Frequency of Test	Cut-Off Time	Turnaround Time
Culture & sensitivity	Tissue	In a sterile leak proof container- transported to the lab within 30 mins	**N.B. Do not add formaldehyde as this will kill any bacteria present**	YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours
	Biopsies†	In a sterile leak proof container		YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours
	Bone	In a sterile leak proof container		YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours

† **Biopsies for H. pylori:** the biopsy should be in sterile nutrient broth and transported to the laboratory immediately. Sterile nutrient broth is available in the Microbiology Department.

Other tissues and biopsies: Place in a sterile container for transport as soon as possible. The volume of the specimen influences the transport time that is acceptable. Larger pieces of tissue maintain the viability of anaerobes for longer.
Tissue or biopsy material in a sterile container has an optimal time for transport to the laboratory of up to 30 mins. If processing is delayed, refrigeration is preferable to storage at ambient temperature. Delays of over 48 hrs are undesirable

Test	Sample Type	Sample Volume	Special Conditions	PTS	Frequency of Test	Cut-Off Time	Turnaround Time
Culture & sensitivity	Chest Drain Tip	In a sterile leak proof container		YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours
	Pacemaker	In a sterile leak proof container		YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours

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9.8.9 MRSA/ Vancomycin Resistant Enterococci (VRE)/ CRE Screens & Environmental Screens

Please label all samples clearly with the patient's name, DOB or Hospital number, date and time of collection and the specimen type.

Test	Sample Type	Sample Volume	Special Conditions	PTS	Frequency of Test	Cut-Off Time	Turnaround Time
MRSA Screen* Culture	Nasal & groin swabs		Refer to Infection Control manual	YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 48-72 hours
VRE Screen Culture & sensitivity	Faeces Rectal swab	1-2g of faeces	Refer to Infection Control Manual	YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 48-72 hours
CRE Screen Culture& sensitivity	Faeces Rectal swab			YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 48-72 hours
Environmental samples Culture	Pharmacy Plates/ Swabs			NO	Mon-Friday	4.30pm	48 hours
Culture & sensitivity	Environmental swabs			YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	Culture: 16-72 hours
Culture	Settle plates			NO	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	48 hours

* An MRSA screen consists of a nasal swab and a groin swab only. Use one swab only for left and right nostrils.

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9.8.10 Blood Culture

Blood cultures are continuously monitored on analyser and processed on a 24 hour basis.

The blood culture bottles and system in use are the Bac T Alert (Biomerieux) system. There is an expiry date on each bottle and they should not be used after this date.

Please label all samples clearly with the patient's name, DOB or Hospital number, date and time of collection and the specimen type.

DO NOT place addressograph label over the Bar Code on bottle

Blood culture bottles may be transported in the hospital pneumatic tube system (PTS)

Test	Sample Type	Sample Volume	Special Conditions	PTS	Frequency of Test	Cut-Off Time	Turnaround Time
Blood Culture-Adults	2 bottles; a green top (Aerobic) and a purple top (Anaerobic)	10 ml of blood	Do not exceed the manufacturer's recommended maximum volume for each bottle:	**NO**	Mon-Sun (blood cultures are continuously monitored)		Culture: **Negative**- 5 days **Positive**- Telephoned on day of detection
Blood Culture-Paediatrics	1 bottle; a yellow top bottle (If paediatric bottle unavailable, use 1green (aerobic) bottle	Neonates ; 1-2 ml Infants; 2-3ml Pre-teen children; 3-5ml	Do not exceed the manufacturer's recommended maximum volume for each bottle:	**NO**	Mon-Sun (blood cultures are continuously monitored)		Culture: **Negative-** 5 days **Positive-** Telephoned on day of detection

Optimal time of collection Before Antimicrobial therapy where possible and as soon as possible after a spike of fever, except in endocarditis where timing is less important.

NOTE: If blood for other tests such as blood gases or ESR is to be taken at the same venepuncture, the blood culture bottles should be inoculated first to avoid contamination. It is preferable to take blood for culture separately.

Notes on transport: Where there is a delay in transport to the laboratory and/or loading on to the automated system, blood cultures should be incubated at 33-37°C as soon as possible after inoculation, pending processing, and **must not be refrigerated**. If an incubator is unavailable on the ward, storage at ambient temperature is preferable to refrigeration before transportation

Method of Collection

Disinfect the skin at the venepuncture site with 2% chlorohexidine and 70% isopropyl alcohol and allow to dry. Remove the flip caps and disinfect the septum of the blood culture bottle with 2% chlorohexidine and isopropyl alcohol and allow to dry (the use of iodine-based disinfectants is **NOT** recommended for some commercial systems as this is said to affect the integrity of the butyl rubber septum). If inoculating more than one type of BacT/Alert blood culture bottle using a butterfly blood collection set and direct draw adapter cap, inoculate first the aerobic culture bottle and then the anaerobic culture bottle so that any oxygen trapped in the tubing will not be transferred to the anaerobic bottle. Monitor the direct draw process closely at all times during collection to assure proper flow is obtained and to avoid flow of the bottle contents into the adapter tubing. Due to the presence of chemical additives in the culture bottle, it is important to prevent possible backflow and subsequent adverse reactions.

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- Hold the culture at a position below the patients arm with the bottle in an upright position.
- Blood may be collected with a butterfly blood collection set and the Blood collection adapter cap. NOTE The manufacturer has informed us of an issue where the leur connector may disengage from the adapter, exposing the needle and giving a risk to needle-stick injury. Maintain control of the leur connector by securing it between thumb and forefinger. To prevent overfilling monitor the blood volume intake into the blood culture bottle, using the 5ml incremental markings on the blood label.
- Do not use a bottle that contains media exhibiting turbidity, excess gas pressure (bulging septum); these are signs of contamination

Samples should not be taken through an intravenous catheter or other access device unless no other access is available.

Take two sets during any 24h period for each septic episode. For neonates, take a single aerobic bottle or special paediatric bottles.

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9.8.11 Intravascular Cannulae

Please label all samples clearly with the patient's name, DOB or Hospital number, date and time of collection and the specimen type.

Test	Sample Type	Sample Volume	Special Conditions	PTS	Frequency of Test	Cut-Off Time	Turnaround Time
Culture & sensitivity	Cannula/ Lines/Tips	4cm of the tip into a sterile container		YES	Mon-Sat	4.30pm (Mon-Fri) 11.30 (Sat)	16-72 hours

Ideally the specimen should be obtained prior to antimicrobial therapy

Method of Collection

Cannulae
Disinfect the skin around the cannula entry site, remove cannula using aseptic techniques, and cut off 4cm of the tip into a sterile container using sterile scissors
Specimens should be transported to the laboratory and processed as soon as possible. If processing is delayed, refrigeration is preferable to storage at ambient temperature. Delays of over 48h are undesirable

9.8.12 CSF/Skin Scrapings

Please label all samples clearly with the patient's name, DOB or Hospital number, date and time collected.

N.B.: IT IS VERY IMPORTANT TO SPEAK WITH THE CONSULTANT MICROBIOLOGIST BEFORE ANY SPECIMENS ARE TAKEN FROM PATIENTS SUSPECTED OF TSE/NvCJD AND TO NOTE THIS IN CLINICAL DETAILS ON REQUEST FORM

Test	Sample Type	Sample Volume	Special Conditions	PTS	Frequency of Test	Cut-Off Time	Turnaround Time
Culture & sensitivity	CSF	1-2ml in 3 sterile universal containers sequentially marked 1, 2 & 3	**Send immediately to the laboratory**	**NO**	Mon-Sun 24 hours a day	No cut-off time	Microscopy & Gram results are available on day of receipt. Culture: 16-72 hours
Skin scrapings for meningococcal detection	Material from rash collected on slide		**Send immediately to the laboratory**	**NO**	Mon-Sun 24 hours a day	No cut-off time	Gram results are available on day of receipt

Please note: CSF and skin scraping samples are never sent via the PTS

Please send as large a volume as possible. CSF is normally collected sequentially into three or more separate sterile universal containers, which should be numbered consecutively. Send all samples immediately to the Microbiology laboratory, unless the CSF is from a Haematology patient in which case the CSF is sent directly to Haematology Laboratory. Do not refrigerate.

All samples and forms should be sent to Microbiology who will distribute samples to other laboratories such as Biochemistry, etc.
Samples will be forwarded to Biochemistry for protein and glucose. If oligoclonal bands are requested the clotted blood sample and CSF will also be forwarded to the Biochemistry laboratory.

Ideally a minimum volume of 1 ml should be sent for culture for Mycobacterium species.

TSE/vCJD requests for 14-3-3 or prion detection, please contact the Microbiology lab as these tests have to reach the Reference Lab by 4pm.

Where Meningococcal meningitis/ pneumococcal meningitis/ Haemophilus influenazae meningitis or Group B streptococcal meningitis are suspected, CSF and blood specimens can be referred to the Irish Meningococcal and Meningitis Reference Laboratory (IMMRL) for PCR. Please send Irish Meningococcal and Meningitis Reference Laboratory Temple Street Request form (http://www.cuh.ie/index.php?id=69&file=tl_files/departments/Pathology%20Dept/IMMRL%20request%20form.pdf) with these samples.

Please send an EDTA blood sample (2.5-5mls).

Samples will be referred for requested virology or virology PCR tests to the National Virus Reference Laboratory (NVRL)

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CSF References ranges and Critical values

Normal CSF values		
Leucocytes (WCC)	Neonates	0-30 cells / cmm
	1 – 4 years	0-20 cells / cmm
	5 – puberty	0-10 cells / cmm
	Adults	<6 cells / cmm
Erythrocytes (RCC)	Newborn	0-675 cells / cmm
	Adults	<11 cells / cmm
Protein		15 - 45mg/dl
Glucose	17 Years and over <17 Years	2.2- 3.9 mmol/l 3.3-4.5 mmol/l Csf glucose values should be approx. 60% of the plasma glucose values and must always be compared with concurrently measured plasma values for adequate clinical interpretation.

These values represent the upper and lower limits of normality. Bacterial or viral infection may still need to be considered where leucocyte counts are near the upper normal limits in neonates and young children.
Due to this any WCC above 5 are fully investigated.

Abnormalities associated with bacterial meningitis are:

- reduced glucose concentration
- elevated protein concentration
- raised white blood cell (WBC) count
- elevated intracranial pressure

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9.8.13 Specimens for the TB Laboratory

Please label all samples clearly with the patient's name, DOB or Hospital number, date and time collected.
If the patient is suspected of having T.B. wear appropriate PPE as identified by local risk assessment during collection and discard any waste material into clinical waste bags.

Test	Sample Type	Sample Volume	Special Conditions	PTS	Frequency of Test	Cut-Off Time	Turnaround Time
TB Culture & sensitivity	Sputum*	At least 5mls in a sterile universal container	3 early morning sputum specimens collected on 3 consecutive days	YES	Monday, Wednesday & Friday	By 9am on day of processing	Microscopy: On day of processing Culture: **Negative:** 8 weeks **Positive:** Telephoned on day of detection
	Urine†*	At least 5mls in a sterile universal container	3 early morning urine specimens collected on 3 consecutive days	YES	By request only. See note below.	By 9am on day of processing	Microscopy: On day of processing Culture: **Negative:** 8 weeks **Positive:** Telephoned on day of detection
	BAL/ bronchial brushes/ bronchial washings	At least 5mls in a sterile universal container		YES	Monday, Wednesday & Friday	By 9am on day of processing	Microscopy: On day of processing Culture: **Negative:** 8 weeks **Positive:** Telephoned on day of detection
	Pleural Fluids	At least 1ml in a sterile universal container		YES	Monday, Wednesday & Friday	By 9am on day of processing	Microscopy: On day of processing Culture: **Negative:** 8 weeks **Positive:** Telephoned on day of detection
	Body fluids	At least 1ml in a sterile universal container		YES	Monday, Wednesday & Friday	By 9am on day of processing	Microscopy: On day of processing Culture: **Negative:** 8 weeks **Positive:** Telephoned on day of detection
	Gastric lavage#	At least 5mls in a sterile universal container		YES	Monday, Wednesday & Friday	By 9am on day of processing	Microscopy: On day of processing Culture: **Negative:** 8 weeks **Positive:** Telephoned on day of detection
	CSF	At least 1-2ml in a sterile universal container		**NO**	Monday, Wednesday & Friday	By 9am on day of processing	Microscopy: On day of processing Culture: **Negative:**

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Test	Sample Type	Sample Volume	Special Conditions	PTS	Frequency of Test	Cut-Off Time	Turnaround Time
TB Culture & sensitivity							8 weeks **Positive:** Telephoned on day of detection
	Pus	In a sterile universal container		YES	Monday, Wednesday & Friday	By 9am on day of processing	Microscopy: On day of processing Culture: **Negative:** 8 weeks **Positive:** Telephoned on day of detection
	Skin/ tissue biopsies	In a sterile universal container		YES	Monday, Wednesday & Friday	By 9am on day of processing	Microscopy: On day of processing Culture: **Negative:** 8 weeks **Positive:** Telephoned on day of detection
	Bone	In a sterile universal container		YES	Monday, Wednesday & Friday	By 9am on day of processing	Microscopy: On day of processing Culture: **Negative:** 8 weeks **Positive:** Telephoned on day of detection
	Blood	Please contact the laboratory for the appropriate blood culture bottles		**NO**	Processed at the Irish Mycobacterium Reference Laboratory, St. James's Hospital (IMRL)	12pm on day of collection as samples must be transported to St. James's Hospital	7 weeks
	Bone Marrow	Please contact the laboratory for the appropriate blood culture bottles		**NO**	Processed at the Irish Mycobacterium Reference Laboratory, St. James's Hospital (IMRL)	By 12am on day of processing	7 weeks
Quantiferon Assay	Blood	Please contact the laboratory for the appropriate blood collection tubes	**This test is for a respiratory or pre-immunosuppression screen only. Please contact Clinical microbiology team for any queries**	YES	On request only. Processed at the TB Laboratory, Microbiology Dept. Mater Misericordiae Hospital	By 4.30pm Monday to Thursday	

Specimens should be transported and processed as soon as possible. Sputum may be refrigerated for up to 2-3h without an appreciable loss of pathogens.

* **If routine culture is required, a separate specimen and request form are required.**

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† TB testing is only carried out on urines at the request of the urology or respiratory services following discussion with the Consultant Medical Microbiologist.

Please contact the laboratory prior to sending Gastric Lavage specimens.

Specimens can be referred for PCR (molecular techniques for the detection of mycobacteria) following discussion with Microbiology Medical Team. These specimens are referred to an external laboratory (Royal Victoria Hospital Belfast Lab)

Quantiferon Specimen Collection

Quantiferon-TB gold IT uses the following collection tubes:

Nil control (grey cap)

TB antigen (red cap)

Mitogen control (purple cap)

Antigens have been dried onto the inner wall of the blood collection tubes so it is essential that the contents of the tubes are mixed thoroughly with the blood.

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The following protocol should be followed for optimal results:

- For each patient collect 1 ml of blood directly into each of Quantiferon -TB gold IT blood collection tubes.
- As they are 1 ml tubes draw the blood relatively slowly keeping the tube on the needle for 2-3 seconds once the tube appears to have completely filled, to ensure the correct volume is drawn.
- The black mark on the side of the tube indicates the 1ml fill volume. If a butterfly needle is being used to collect blood, a purge tube should be used to ensure that the tubing is filled with blood prior to the Quantiferon-TB gold tubes being used.
- Mix the tubes thoroughly by turning the tube end over end 8-10 times or shaking the tubes for 5 seconds.
- Label the tubes appropriately and deliver the sample to the specimen reception area in the microbiology laboratory.
- Samples will be accepted up to 4.30pm Monday to Thursday. Samples should be stored at 33-37°C if there is a delay – this should be done in the laboratory**. They should not be refrigerated or frozen.**
- Any queries regarding the collection and transport of samples please contact Microbiology specimen reception at 4143940
- These samples are processed in the Mater Misericordiae Hospital

9.8.14 Antibiotic Assays

Please label all samples clearly with the patient's name, DOB or Hospital number, date and time collected.

Test	Sample Type	Sample Volume	Special Conditions	PTS	Frequency of Test	Cut-Off Time	Turnaround Time
Gentamicin	Clotted blood sample (red topped)	**Adults:** 5-10ml **Neonates:** 1-2 ml **Infants:** 2-3 mls **Pre-teen:** 3-5 mls		YES	Mon-Sun each day	3 pm weekdays 11am Sat, Sun & Bank holidays	Weekdays: Result by 5pm Weekends & Bank holidays: Result by 1pm
Vancomycin	Clotted blood sample (red topped)	**Adults:** 5-10ml **Neonates** 1-2 ml **Infants:** 2-3 mls **Pre-teen:** 3-5 mls		YES	Mon-Sun each day	3 pm weekdays 11am Sat, Sun & Bank holidays	Weekdays: 5pm Weekends & Bank holidays: Result by 1pm
Amikacin	Clotted blood sample (red topped)	**Adults:** 5-10ml **Neonates:** 1-2 ml **Infants:** 2-3 ml **Pre-teen:** 3-5 ml		YES	Mon-Sun each day	3 pm weekdays 11am Sat, Sun & Bank holidays	Weekdays: 5pm Weekends & Bank holidays: Result by 1pm
Tobramycin	Clotted blood sample (red topped)	**Adults:** 5-10ml **Neonates:** 1-2 ml **Infants:** 2-3 ml **Pre-teen:** 3-5 ml		YES	Mon-Sun each day	3 pm weekdays 11am Sat, Sun & Bank holidays	Weekdays: 5pm Weekends & Bank holidays: Result by 1pm
Teicoplanin*	Clotted blood sample (red topped)	**Adults:** 5-10ml **Neonates:** 1-2 ml **Infants:** 2-3 mls **Pre-teen:** 3-5 mls	Lithium Heparin blood samples are unsuitable for this assay	YES	Mon-Thursday	2 pm weekdays This service is not available at the weekends	By 5pm the following day

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A few antibiotics e.g. aminoglycosides, exhibit a narrow range between therapeutic and toxic concentrations. Assays of antibiotic levels in the blood may be necessary to confirm that adequate concentrations of antibiotic are being achieved in blood OR in order to avoid excessive blood concentrations when the drug is known to be toxic especially if the patient has impaired renal of hepatic function, or in neonates whose renal and hepatic handling of drugs is imperfectly developed.

Sample required A minimum of 1ml clotted blood in a sterile screw capped bottle.

*Teicoplanin assays are referred out to The Antimicrobial Reference Laboratory, Southmead Hospital, Bristol, England. Serum samples need to be in the laboratory by 2pm Monday to Thursday. Results are available by 5pm the following day.

OPTIMAL TIME OF SPECIMEN COLLECTION

Trough Level: Trough levels should be taken immediately prior to the administration of the next dose.
Peak Level: Not routinely recommended**.** If required take 1 hour after the end of administration of antibiotic dose.

Details of dose and timing should be recorded on the request form.

Random levels are difficult to interpret. If taken to determine whether another dose should be given they should be considered trough levels and the time from last dose recorded on the request form.

Causes of inaccurate, sometimes patently pharmocokinetically impossible results include:

1. Mistiming of dosing/ levels
2. Omission of dose
3. Administration of dose into a slowly flowing infusion
4. Drawing a blood sample back down an IV cannula used for administering antibiotics.

THERAPEUTIC DRUG LEVEL MONITORING – REFERENCE RANGES

ANTIBIOTIC	NORMAL REFERENCE RANGE (µg/ml)	
	Single Daily Dose	***Multiple Daily Dose***
Gentamicin	**Trough: <1** -For OD dosing, Trough levels should be taken >18 hours post dose. If Normal Renal Function, monitor level once weekly **Peak: 10 - 20**	**Trough: <2** If Normal Renal Function, monitor level twice weekly. **Peak: 5 – 10**
Vancomycin		**Trough: 10 – 20** For complicated infections, e.g. Endocarditis, Hospital Acquired Pneumonia, a higher Trough of 15-20 is recommended. If advice required, please discuss with clinical microbiology or pharmacy **Peak: Not routinely required**

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ANTIBIOTIC	NORMAL REFERENCE RANGE (µg/ml)	
Amikacin	**Trough: <5 Peak: >50**	**Trough: 5 - 10 Peak: 20 - 30**
Tobramycin	**Trough: <1 Peak: 10 - 20**	**Trough: <2 Peak: 5 - 10**
Teicoplanin	**Standard Trough: ≥15** For severe infections higher Trough's are required. See medicines guide. **Peak: Not routinely required**	

9.8.15 Serology

Please label all samples clearly with the patient's name, DOB or Hospital number, date and time collected.

The following serological test is undertaken on site and requires approximately 10mls clotted blood

Test	Sample Type	Sample Volume	Special Conditions	PTS	Frequency of Test	Cut-Off Time	Turnaround Time
Pseudomonas Antibodies	Clotted blood sample (red top)	5-10 mls		YES	Batched		6 weeks

All other serological and immunological tests are referred to external laboratories for testing. See Reference lab section for a list of commonly referred tests.

9.8.16 Specimens for Mycology

Specimens for mycology (e.g. skin, hair and nails) should be placed in a sterile universal container and sent to the Microbiology Laboratory. These specimens are referred to external laboratories. See Reference lab section for a list of commonly referred tests.

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9.9 LIST OF TESTS SENT TO REFERRAL LABORATORIES

All Microbiological referred specimens must be processed through the AMNCH Microbiology Laboratory.

9.9.1 Virology

Requests for virology are referred to the National Virus Reference Laboratory. University College Dublin, Belfield, Dublin 4.

Please contact the Microbiology Laboratory with any queries relating to specimens for virology testing.

Some virology requests may be sent to other reference laboratories (see below)

Please label all samples clearly with the patient's name, DOB or Hospital number, date and time collected.

TESTS AVAILABLE

Requests for Urgent investigation must be arranged by telephone with the NVRL clinical team

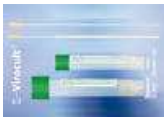
See website for additional information relating to diseases, pathogens and specimens required.

www.nvrl.ie

Requests for 'Viral screen', 'routine virology' or 'atypical screen' without accompanying clinical information will not be processed. Failure to supply the required information will lead to delays in reporting

Requests for atypical pneumonia screen on clotted blood sample (including Chlamydia, Mycoplasma, Q fever and Legionella) are only performed when a convalescent serum is sent 14 days after the acute blood sample has been taken. Mycoplasma serology testing is not available in patients >20 years.

Specimens must be collected in appropriate plastic leak proof containers with a screw top lid.

- **Virology swabs**  and **salivary collection system** for **measles** are available from Microbiology.
- **Chlamydia swabs for eyes** are also available. See below. White top only.
- **Viral PCR on blood samples-** A minimum of 1ml of either serum or plasma separated from whole blood and frozen within 6 hours, is required to perform the test. Please send blood to the microbiology department within 2 hours of taking. **Arrange with Microbiology laboratory during routine working hours. Notify the scientist out of routine hours on bleep 7280 if you are sending a sample**
- **Clotted Blood**
  For serological investigations serum samples (>1ml) or 1 x 5 to 10ml container of clotted blood should be sent to the NVRL.
- **EDTA whole blood for CMV pp65 detection (Antigenaemia)**
  Whole blood for CMV pp65 detection must be collected in an EDTA tube and received at the NVRL within 6 hours of collection.

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- **Stool**
  5 to 10g should be transported in a sterile universal container. Transport medium is not required. For Molecular detection of Norovirus, specimens should be transported to the laboratory as soon as possible post collection. Alternatively specimens may be stored at 4ºC for up to 72 hrs before dispatch. For Norovirus (Winter Vomiting Bug), faeces samples should be restricted to 1 in 4 patients.

- **Cerebrospinal Fluid**
  If possible, collect 1ml into a sterile container for virus isolation and molecular investigation. Transport medium is not required. Specimens should be transported without delay.

- **Urine**
  10 to 20ml of urine should be sent in a sterile container. Specimens should be transported without delay.

- **Respiratory Secretions**
  Respiratory viruses are extremely thermolabile and therefore should be transported to the laboratory without delay. The quality of the sample is a major determinant in identifying the causative agent.

  Throat swabs and other swabs are obtained by swabbing the affected site with Viral Transport Swabs.

  Nasopharyngeal secretions should be aspirated into a sterile plastic mucous extractor. Transport the mucous extractor with the secretions to the NVRL.

  Throat washings are collected by asking the patient to gargle with 10ml of saline solution, which is then put into a sterile screw-capped container.

  A broncho-alveolar lavage should be transported in a sterile container.

- **Eye Swabs / Scrapings**
  Conjunctival swabs and scrapings for virus isolation should be taken into VTM. Specimens should be transported without delay.

- **Skin Lesions**
  Virus isolation: Vesicular fluids and cellular material from the base of lesions should be collected during the first 3 days of vesicle eruption. Vesicle fluid may be aspirated with a needle and syringe into a sterile bottle or collected onto a swab, which is then placed, into VTM. The base of the opened vesicle can then be scraped with a sterile scalpel and the cellular material washed into VTM.

  Electron Microscopy: Vesicular fluids and cellular material from the base of lesions should be collected during the first 3 days of vesicle eruption. Vesicle fluid may be aspirated with a needle and syringe, the base of the opened vesicle can then be scraped with a scalpel. The cellular material and/or the vesicle fluid should be smeared onto the centre of a clean microscope slide and air-dried. Do not fix this material for Electron Microscopy. Place the slide in a plastic slide carrier for transport.

- **Deaff Tests**
  Send an EDTA blood sample to the Microbiology Laboratory no later than 12.00 pm for dispatch.

- **Post - mortem or Biopsy specimens**
  Fresh unfixed tissues should be collected aseptically from the probable sites of infection using separate sterile instruments to cut and remove each sample. Place each sample in a separate sterile container and label appropriately. Specimens should be transported without delay.
  Scabs or biopsy material for electron microscopy should be sent in a dry bottle.
  Rapidly frozen tissue may also be sent for electron microscopy.

- **Oral fluid (Saliva) specimens**
  Oral fluid (Saliva) specimens should be collected using a foam swab supplied by the NVRL or using commercially available collection devices. Please contact the NVRL laboratory with queries.

- **Specimens for Molecular Virology**
  Serum and plasma samples for molecular virology testing should be separated from whole blood within 6 hours of venepuncture and frozen immediately at –20ºC to maintain the integrity of the viral DNA or RNA. These samples should be dispatched to the NVRL in a frozen state. Alternatively

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whole blood (EDTA or clotted blood) can be sent to the NVRL within 6 hours of venepuncture. Specimens anti-coagulated with heparin are not suitable for PCR.

- **Chlamydia trachomatis**
  Ophthalmic specimen: Use APTIMA UNISEX SWAB. Specimen Collection Kit and instructions available from the Microbiology Laboratory.

9.9.2 List of Tests referred to Royal Victoria Hospital Belfast Lab

Please label all samples clearly with the patient's name, DOB or Hospital number, date and time collected and the specimen site.

Investigation	Sample Required
Allergic Alveolitis Screen	Clotted blood sample/ EDTA sample (1-10ml)
ASOT	Clotted blood sample (1-10ml)
Aspergillus/ M. faeni serology	Clotted blood sample (1-10ml)
Brucella serology	Clotted blood sample (1-10ml)
Legionella-serology	Clotted blood sample (1-10ml)
Mycology - Nail clippings (culture)	 Nail Clippings in a sterile universal container
Typhoid & Paratyphoid serology (Widal test)	Clotted blood sample (1-10ml)

Note: Specimens are sent to the Royal Victoria Hospital Belfast Lab Monday-Thursday. Specimens for referral to the Royal Victoria Hospital Belfast Lab need to be in the Microbiology Laboratory by 3pm on these days.

For specific details on any requirements of the Belfast laboratory please refer to - http://www.belfasttrust.hscni.net/pdf/130107_BTL_UserManual.pdf"

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9.9.3 List of Tests referred to the Irish Meningococcal and Meningitis Reference Laboratory (IMMRL)

- Samples being referred to the IMMRL must be sent using the IMMRL request form and not AMNCH request form.

- Ensure specimen and request form are correctly labelled with:
  - Patient's Name (Surname and Forename)
  - Patients Hospital number
  - Patients date of Birth
  - Date of onset of Disease
  - Date and time of collection of sample
  - Gender
  - Address
  - Patient Location (Hospital/ Ward)
  - Consultant/Clinician
  - Signature and bleep of person who has taken the specimen (Clinician/Nurse)
  - Test required/specimen type and clinical details

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Investigation	Sample required	Frequency of Test	Turnaround Time
Meningococcal PCR	EDTA blood (2.5-5mls) CSF (at least 100µl)	Mon-Friday	Positive results are phoned to the Microbiology Laboratory by 5pm on day of receipt of specimen by the IMMRL
Meningococcal Serology†	Clotted blood sample (red top)(at least 0.5 ml)	Mon-Friday	
Pneumococcal PCR	EDTA blood (2.5-5mls) CSF (at least 100µl)	Mon-Friday	Positive results are phoned to the Microbiology Laboratory by 5pm on day of receipt of specimen by the IMMRL
Haemophilus influenzae PCR	EDTA blood (2.5-5mls) CSF (at least 100µl)	Mon-Friday	Positive results are phoned to the Microbiology Laboratory by 5pm on day of receipt of specimen by the IMMRL
Group B Streptococcal PCR	EDTA blood (2.5-5mls) CSF (at least 100µl)	Mon-Friday	Positive results are phoned to the Microbiology Laboratory by 5pm on day of receipt of specimen by the IMMRL

† Paired serum specimens (at least 0.5 ml) for serology should be obtained. Blood or serum submitted for PCR will serve as a suitable acute specimen, as will any other blood or serum sample taken within 24 hours of admission. Whether or not an acute specimen was obtained, it is still worthwhile to collect a convalescent specimen, ideally 14 to 21 days after admission to hospital.

Note: Specimens for referral to the IMMRL for investigation need to be in the Microbiology Laboratory by 9am Monday to Friday for specimens to be processed on day of receipt.

Meningococcal PCR/Pneumococcal PCR/Haemophilus influenzae and Group B Streptococcal PCR- If transportation is delayed, please refrigerate sample at 4°C

For specific details of the IMMRL laboratory please refer to the following link at the Childrens University Hospital website. Here alos is a link to the CUH request for for Meningococcal Request form"

http://www.cuh.ie/index.php?id=69

9.9.4 Lists of Tests referred to the Central Pathology Laboratory, St James's Hospital, Dublin

Please label all samples clearly with the patient's name, DOB or Hospital number, date and time collected and the specimen site.

Investigation	Sample Required	Processing Laboratory
Chlamydia trachomatis	**Female** Endocervical swab* First void urine (15-20ML) **Male** First void urine (15-20ML) Urethral swabs*	Microbiology Laboratory, St James's Hospital
Syphilis/ VDRL/TPHA/RPR	Clotted blood sample (1-10ml)	Microbiology Laboratory, St James's Hospital
Pneumococcal Antibodies	Clotted blood sample (1-10ml)	Immunology Laboratory, St James's Hospital
Tetanus Antibodies	Clotted blood sample (1-10ml)	Immunology Laboratory, St James's Hospital
Mycobacterium culture of blood and bone marrow	Blood culture Bone Marrow	Irish Mycobacterial Reference Laboratory, CPL, St. James's Hospital,
Mycobacterium Susceptibility testing	TB positive isolates†	Irish Mycobacterial Reference Laboratory, CPL, St. James's Hospital
TB PCR	Early Morning Urine (EMU) BAL Sputum Body Fluids CSF	Irish Mycobacterial Reference Laboratory, CPL, St. James's Hospital

* Please contact the Microbiology Laboratory for the appropriate swabs (ABBOTT Multi Collect Transport Tubes)and sampling protocol. If there is a delay in transporting specimens to the laboratory please refrigerate at 4°C.

† All TB positive isolates processed in the Microbiology Laboratory, Tallaght Hospital are referred to the Irish Mycobacterial Reference Laboratory for identification and susceptibility testing.

Please refer to links for the laboratory user manuals for the Microbiology Laboratory at St James Hospital at the following link"

http://search.stjames.ie/Labmed/

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9.9.5 List of Tests sent to other Referral Laboratories

Please label all samples clearly with the patient's name, DOB or Hospital number, date and time collected and the specimen site.

Test Referred to other Laboratories	Sample Type
Acyclovir Levels Chloramphenicol levels Colistin/Colomycin levels Ganciclovir Septrin Levels Streptomycin levels	Clotted blood sample (1-10ml)
Amphotericin levels Candida titres Flucytosine Levels Galactomannon Levels Itraconazole Levels Voriconazole levels Coccidioides (Coccidiodes immitus) serology	Clotted blood sample (1-10ml)
Ameobiasis (serology) Echinococcus (serology) Fascioliasis (Fasciola Hepatica) Filaria Leishmaniasis Schistomiasis Toxicariasis Trichinella spiralis Trypanosomes	Clotted blood sample (1-10ml)
Babesiosis microti (microscopy)	Fresh EDTA sample
Babesiosis microti (serology)	Clotted blood sample (1-10ml)
Anaerobes (Identification and Typing)	Cultured isolate sent from laboratory
Acanthamoeba	Vitreous Fluid Corneal scrapings Conjuctival swabs
Antibiotic Reference	Cultured isolate sent from laboratory
Anthrax	Serology-Clotted blood sample (1-10ml) Cultured isolate sent from laboratory
Anti-Staphylococcus Antibodies	Clotted blood sample (1-10ml)
Arbovirus Flavivirus Rickettsiae (Weil Felix Test)	Clotted blood sample (1-10ml)

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Test Referred to other Laboratories	Sample Type
Bacillus identification (slope)	Cultured isolate sent from laboratory
Bartonella (serology)	Clotted blood sample (1-10ml)
Bordetella pertussis antibodies (serology) Bordetella pertussis PCR	Clotted blood sample (1-10ml) Nasopharyngeal swab or aspirate
H.influenza-respiratory isolates from immunocompromised patients and carriage isolates from patients with invasive disease Ureaplasma	Cultured isolate sent from laboratory Clotted blood sample (1-10ml)
Campylobacter serology, (IgG, IgM, IgA)	Clotted blood sample (1-10ml)
Cardiomyopathy Screen (serology) (Myocarditis Screen) - Coxsackie A+B PCR (EDTA Sample) - Echovirus -EBV viral load	Clotted blood sample (1-10ml)
CJD/vCJD TSE	CSF (2-5mls)
Chlamydia Psittacosis	Clotted blood sample (1-10ml)
Corynebacterium diphtheriae (Anti diphtheria toxin) Streptococcus reference-serology/ slope	Clotted blood sample (1-10ml) Cultured isolate sent from laboratory Clotted blood sample (1-10ml) Cultured isolate sent from laboratory

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Test Referred to other Laboratories	Sample Type
Cystic fibrosis genotype	EDTA (3-5mls)
E.coli 0157 serology	Clotted blood sample (1-10ml)
E.coli 0157 PCR E.coli 0157 Confirmation	Faeces sent from laboratory Cultured isolate sent from laboratory
Enterics (Identification & typing) Salmonella/Shigella	Cultured isolate sent from laboratory
Francisella tularensis (serology) Yellow fever	Clotted blood sample (1-10ml)
Lassa Virus Marberg Virus Ebola Virus . -Crimean Congo Haemorrhagic Fever Virus CONTACT MEDICAL MICROBIOLOGIST BEFORE SENDING SAMPLE	Clotted blood sample (1-10ml)*
Haemophilus influenza (Anti Hb)-antibodies	CSF Joint aspirate Serum
Haemophilus influenza(Anti Hb)-genotype	Cultured isolate sent from laboratory
Hantavirus	Clotted blood sample (1-10ml)
Histoplasmosis serology	Clotted blood sample (1-10ml)
HPV (Culture)	Tissue Cervical cells
Hydrotherapy pool water	Hydropool water
Hydatid serology	Clotted blood sample (1-10ml)
Insects for identification	Insects
Listeria PCR	Clotted blood sample (1-10ml) CSF
Melioidosis serodiagnosis	Clotted blood sample

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Test Referred to other Laboratories	Sample Type
	(1-10ml)
MRSA isolates	Cultured isolate sent from laboratory for typing
PCP Detection	BAL
PVC (Pneumococcal Polysaccharide Conjugate Vaccine)- to measure the uptake of vaccine	Clotted blood sample (1-10ml)
Polio serology	Clotted blood sample (1-10ml)
Q Fever	Clotted blood sample (1-10ml)
Rabies serology	Clotted blood sample (1-10ml) CSF
Whipples Disease (Tropheryma whipelii)	Clotted blood sample (1-10ml) CSF Body Fluids
Yersinia serology	Clotted blood sample (1-10ml)

* If a patient presents with Viral Haemorrhagic Fever (VHF), medical personnel should seek advice from the Consultant Microbiologist. Patients for whom diagnosis of VHF cannot quickly be excluded should be referred to specialist centres without delay.

Please contact the Microbiology Laboratory for further information on the above tests if required.

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9.10 INFECTION CONTROL

There is an Infection Control Committee (ICC) responsible for hospital infection control policy and an Infection Control Team (ICT) responsible for the day-to-day control of hospital infection. The ICT is committed to the provision of quality healthcare to all patients. The ICT will facilitate the effective prevention, detection and control of hospital infection in patients, staff and visitors. There is an infection control manual which describes the objectives and content of the infection control programme and contains all policies and procedures.

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APPENDIX 1

USER SATISFACTION, COMMENTS AND COMPLAINTS

	Description	Report Mechanism	Responsible
1.	General Incidents and Operational Issues	Laboratory Medicine Non conformities report form	Laboratory and departmental management team
2.	Health/Safety issues	Laboratory Medicine non conformities report form. AMNCH Risk management occurrence form. Occupational Health Report	Laboratory and departmental management team. Occupational Health Team
3.	Complaints received verbally from staff and patients	Laboratory Medicine non conformities form. AMNCH Risk management occurrence form. (If deemed necessary)	Laboratory Management and Director Quality Manager. Affected staff.
4.	Written complaints	Laboratory Medicine non conformities .form. AMNCH Risk management occurrence form. (If deemed necessary) Patient Advocacy letter	Laboratory Management and Director Quality Manager. Affected staff. Medical Director AMNCH Patient Advocate
5.	Significant operational exceptions	Laboratory Medicine Service Exception Analysis form	Laboratory Manager
6.	Significant risk incidents	AMNCH Risk management occurrence form	Laboratory Management team Quality Manager Affected staff. Risk Manager AMNCH

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User satisfaction is monitored in a variety of ways:

User focus groups e.g. GP Liaison Committee

User satisfaction surveys

Multidisciplinary team meetings

Clinical liaison

Hospital groups and committees

Ward rounds by Laboratory Clinicians

Response to user complaints

Review, analysis and monitoring of incidents and complaints

Communication with users is achieved by various means:

Laboratory Medicine User Manual

Laboratory Web page on AMNCH Intranet

GP Newsletter

Lectures and seminars

Grand Rounds

User focus groups e.g. GP Liaison Committee

Multidisciplinary team meetings

Clinical liaison

Hospital groups and committees

Ward rounds by Laboratory Clinicians

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APPENDIX 2

PNEUMATIC TUBE SYSTEM (PTS)

Brief Operating Instructions are located on laminated cards at each Ward PTS station.
Refer also to Interim Operational Policy Pneumatic Tube Transfer System 2008 available at:
G:\PTS\PTS Operational Policy master.doc version 2

2.1 SYSTEM OPERATION

Follow the summary operation instructions attached to each PTS station. Codes and Names of Departments on the system can be accessed via the station's keypad and the directory.

Correct usage of the PTS system is essential in order to optimise its performance. Porters when collecting pods, should only collect the 2-3 pods assigned to their particular ward.

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2.2 CARRIER DISPATCH

Summary Instruction

- Place the article correctly in the appropriate container and close the top.
- Enter the destination station code.
- Open the station door – insert carrier.
- **CHECK AGAIN THAT THE DESTINATION NUMBER IS CORRECT.**
- Close the door – Green indicator light comes on – The carrier will automatically transfer when the system is ready.

2.3 QUEUING

The central processor continuously monitors the status of each station and will hold the carrier until the line is clear for transfer. When possible, users should batch items to reduce traffic in the system. This will speed up transfer times by reducing the queue length.

2.4 RECEIVING A CARRIER

When a carrier is approaching:

- It is automatically slowed down before entering the station.
- The amber "Carrier Arriving" light comes on.
- An audible alarm sounds.
- The carrier pod on arrival will be deposited in the basket attached to the station.
- The alarm and lights go off.
- The station display indicates **ARRIVAL** and the **SENDER STATION**

THE RECEIVER SHOULD EMPTY THE CARRIER AND IMMEDIATELY RETURN TO SENDER STATION.

PLEASE REDIRECT MIS-ADDRESSED CARRIERS TO THE CORRECT LOCATION.

2.5 SYSTEM FAILURE OR MALFUNCTION

In the event of a system failure or malfunction a code will be displayed on the workstations. The system may purge automatically in which case it will dump the 2 carriers in the system down to stations. These stations will require that those carriers are redirected. In the event of a full malfunction the contact numbers for Technical Services are as follows:

In Hours: 414-2901/2902.

Lunch Time: Phone Security Department on 2100.

Out of Hours: Dial switch '0'

2.6 ADDRESSES OF LABORATORY PTS STATIONS

Clinical Chemistry	001
Haematology	002
Microbiology	003
Blood Transfusion	Use Haematology

2.7 SAMPLES WHICH MUST NOT BE SENT VIA PTS

The following sample types MUST NOT BE SENT via the Pneumatic Tube Transfer System:

DISCIPLINE	SPECIMEN TYPE
Clinical Chemistry	▪ 24 hour urines ▪ CSF
Haematology	▪ Hypercoagulation Screens ▪ Hypocoagulation Screens ▪ Coagulation Inhibitor Levels ▪ Protein C. Levels in Meningococcaemia ▪ HIT Screens ▪ Bone Marrow Samples ▪ Osmotic Fragility Samples ▪ Immunophenotyping
Microbiology	▪ CSF ▪ Skin Scrapings for Meningococcal Detection
Blood Transfusion	▪ Specimen for Transfusion Reaction ▪ Investigation HLA Typing
Cellular Pathology	▪ **No specimens** to be sent by PTS

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Amendments

Changes to version 8.4.

Please ensure that you read the full section that has been changed from the previous version.

Laboratory Medicine Section 1.0

Page	Change

General Practitioner Services Section 2.0

Page	Change

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Adult Phlebotomy Service Section 4.0

Page	Change

Clinical Chemistry Section 5.0

Page	Change
52	Drug Interference Table added
41	TAT for Urinary electrophoresis added
44	24h plain urine for Urinary electrophoresis added to table

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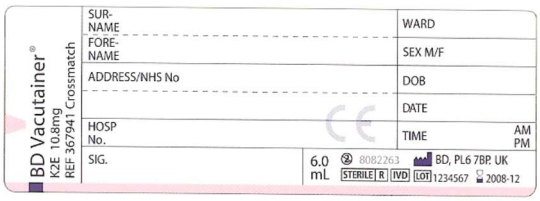
Haematology Section 6.0

Page	Change
62	**RETROSPECTIVE REQUESTING (ADD-ON REQUESTS)** Only the requesting doctor or person nominated by them may request additional testing.
62	**RETROSPECTIVE REQUESTING (ADD-ON REQUESTS)** Blood film: 24 hours post phlebotomy (morphology may not be reportable
62	**RESULTS, ENQUIRIES, TECHNICAL AND CLINICAL ADVICE** • Advice on interpretation of results, sampling & storage procedures and frequency of requesting will be directed to the appropriate person.
63	**URGENT TESTS AVAILABLE ON CALL** ▪ Malaria Screen (only rapid diagnostic test performed out of hours. Examination of thick and thin films including speciation will be carried out on the next routine working day)
66	Peripheral Blood Film: TAT: 2 routine working days
66	E.S.R TAT: 24 hours

Blood Transfusion Section 7.0

Page	Change
72	Policy on the Administration of Blood and Blood Products & Transfusion Guidelines & Patient Information Leaflet are available on the Blood Transfusion Intranet page
73	Contact details for Dr. Ronan Desmond added: ext 4132
75	Information on Cold Agglutinin Screen added: Heatblock is stored in the Immunochemistry Laboratory, Clinical Chemistry Department, Room A1Lab 0236 3.5 27.
77	Added: M.S.B.O.S – Maximum Surgical Blood Ordering Schedule
78	Change a 2nd sample 'is desirable' to 'should be sent' for confirmation of the ABO group
80	Policy Ref number corrected : from PPC-DC-POL-022 to PPC-DG-POL-022
81	Policy Ref number corrected: from EMV-GUI-13 to ENV-GUI-13
82	 Image added
87 & 88	Theatre Fridge Section rewritten to include details on Electronic Blood Track System
98&99	Product availability report on KEY OCS: Removed - However a product availability report is available. This report applies to all products issued by Blood Transfusion. The KEY OCS report contains the following information: • Patient blood group and antibody screen result • Patient special requirements (if applicable)

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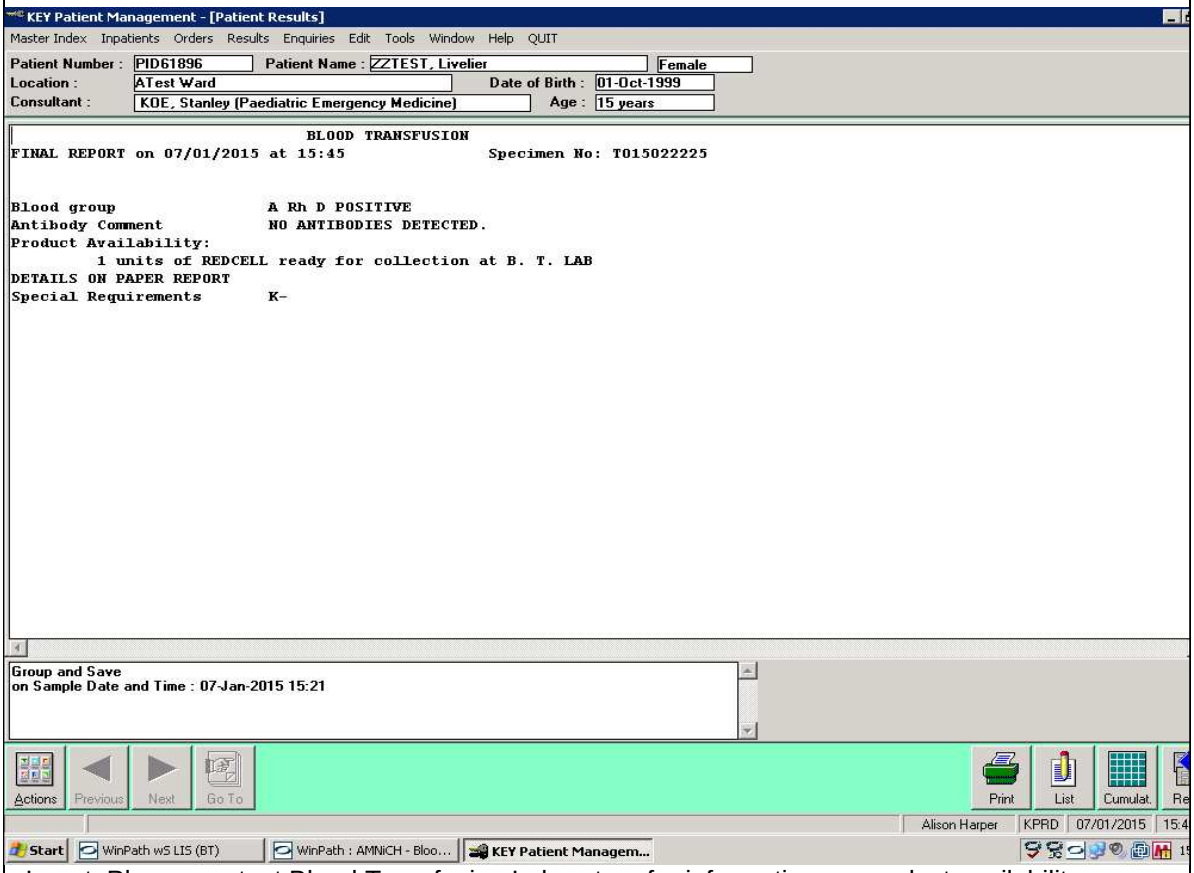
- The type and number of blood/blood products currently available for collection in the Blood Transfusion lab
- Instruction to refer to the paper crossmatch report for complete details on products issued

This report does not contain unit numbers or unit flags

The electronic KEY OCS report is continuously updated to reflect the number of units currently available in the laboratory.

Below is an example of a Blood Transfusion Product Availability report on Key Order Coms:



Insert: Please contact Blood Transfusion Laboratory for information on product availability

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Cellular Pathology Section 8.0

Page	Change
99	Added line about clinical advice in cellular Pathology
99	Added line “The Department complies with the International Standard ISO 15189 (Registration Number 330 MT), and the regulations, policies, terms and conditions of the Irish National Accreditation Board (INAB)”.
100	Removed reference to PTS in cell path
101	Sample type/site is mandatory on the form/container
100&101	10% formalin changed to 10%neutral buffered formalin
102	Radioactive samples should not be submitted for frozen section
103	Added temporal artery to table, removed radioactive sample comment
104	Added GIST molecular analysis, renal biopsy request forms not available from lab, fill in PCD request form
107	Semen analysis appointment days changed
108	TAT for all cytology samples is 5 days
109	MDT table updated

Microbiology Section 9.0

Page	Change

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